No. 4231

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United States
Circuit Court of Appeals
For the Ninth Circuit.

D. J. MURRAY MANUFACTURING COMPANY, a Corporation,

Appellant,

vs.

SUMNER IRON WORKS, a Corporation, and SILVERTON LUMBER COMPANY, a Corporation,

Appellee.

Transcript of Record.

Upon Appeal from the United States District Court for the District of Oregon.

Filmer Bros. Co. Print, 330 Jackson St., S. F., Cal.

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INDEX TO THE PRINTED TRANSCRIPT OF RECORD.

[Clerk's Note: When deemed likely to be of an important nature, errors or doubtful matters appearing in the original certified record are printed literally in italic; and, likewise, cancelled matter appearing in the original certified record is printed and cancelled herein accordingly. When possible, an omission from the text is indicated by printing in italic the two words between which the omission seems to occur.]

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NAMES AND ADDRESSES OF ATTORNEYS OF RECORD.

T. J. GEISLER, 304 Platt Building, Portland, Oregon,

Attorney for Plaintiff and Appellant.

COOLEY, HORAN & MULVEHILL, Wisconsin Building, Everett, Washington,

MacCORMAC SNOW, 501 Platt Building, Portland, Oregon,

Attorneys for Defendants and Appellees.

CITATION ON APPEAL.

United States of America,
District of Oregon,—ss.
To Sumner Iron Works and Silverton Lumber Company, Corporations, GREETING:

WHEREAS, D. J. Murray Manufacturing Company, a Corporation, has lately appealed to the United States Circuit Court of Appeals for the Ninth Circuit from a decree rendered in the District Court of the United States for the District of Oregon, in your favor, and has given the security required by law;

YOU ARE, therefore, hereby, cited and admonished to be and appear before said United States Circuit Court of Appeals for the Ninth Circuit, at San Francisco, California, within thirty days from the date hereof, to show cause, if any there be, why

the said decree should not be corrected, and speedy justice should not be done to the parties in that behalf.

Given under my hand, at Portland, in said District, this 5th day of March, in the year of our Lord, one thousand nine hundred and twenty-four.

R. S. BEAN,
District Judge.

Due service of the foregoing citation on appeal is hereby admitted this 5th day of March, 1924.

ATKINS & ATKINS,
Attorneys for Above-named Sumner Iron Works and Silverton Lumber Co.

No. E.—8615. 25–301. United States Circuit Court, District of Oregon. D. J. Murray Mfg. Co. vs. Sumner Iron Works et al. Citation on Appeal.

[Endorsed]: U. S. District Court, District of Oregon. Filed Mar. 6, 1924. G. H. Marsh, Clerk.

BE IT REMEMBERED that on the 29th day of March, 1922, there was duly filed in the District Court of the United States for the District of Oregon a bill of complaint, and thereupon further proceedings were had, as follows:

In the District Court of the United States for the District of Oregon.

D. J. MURRAY MFG. CO., a Corporation,
Plaintiff,

vs.

SUMNER IRON WORKS, a Corporation, and SILVERTON LUMBER COMPANY,
Defendants.

BILL OF COMPLAINT.

The plaintiff, for his bill of complaint, respectfully shows and alleges:

I.

That the plaintiff is a corporation, duly organized and existing under the laws of the State of Wisconsin, and having its principal office at Wausau, Wisconsin.

II.

That the defendant, Sumner Iron Works, is a corporation duly organized and existing under the laws of the State of Washington, as plaintiff is informed and verily believes, and has its principal office at Everett, Washington, and also maintains a duly authorized agent and an office for the rugular transaction of business, at Portland, Oregon.

III.

That the defendant, Silverton Lumber Co., is a corporation duly organized and existing under the laws of the State of Oregon, and has its principal office at Silverton, Oregon.

IV.

This suit is brought for the infringement of letters patent of the United States, hereinafter specified, duly granted for an invention and to restrain the defendants and each of them, from further infringement of said letters patent, and to require the defendants and each of them, to account for the profits made by them respectively by said infringement, and also to recover the damages sustained by the plaintiff by reason of the infringement.

V.

That prior to April 13, 1909, Charles E. Cleveland, then residing at Fond Du Lac, Wisconsin, was the original, first and sole inventor of a certain new and useful improvement in Log Handling Mechanism, not known or used by others in this country before his invention or discovery thereof, and not patented or described in any printed publication in this or any foreign country before his invention or discovery thereof, or more than two years prior to his application for patent therefor hereinafter recited, and not in public use or on sale in this country for more than two years prior to his application for patent therefor hereinafter recited; and that no application for a foreign patent for said invention was filed more than twelve months prior to the filing of the application for the hereinafter recited patent in this country.

VI.

That on said April 13, 1909, said Charles E. Cleveland made due application for letters patent

of the United States of America, which application was filed on the last-mentioned day under serial No. 489,675, viz., on due proceedings by the said Charles E. Cleveland and the full compliance by him with all requirements of the law thereafter, and on September 7, 1909, letters patent of the United States, No. 933,231, were duly granted to the said Charles E. Cleveland by the Commissioner of Patents of the United States, whereby there was vested in the said Charles E. Cleveland, his legal representatives and assigns, for the term of seventeen years thereafter, the exclusive right to make, use and vend the said patented improvement in log handling mechanism thruout the United States and the territories thereof. That the said letters patent at all times hereinafter mentioned, were and still are in full force and effect, and the said original letters patent are ready to be produced in court in this cause.

VII.

That thereafter and prior to the infringement of the said letters patent by the defendants hereinafter complained of the said letters patent were, for value received by the said Charles E. Cleveland, duly sold, assigned and transferred unto the abovenamed plaintiff and the plaintiff prior to and during the said acts of infringement on the part of the defendants, was and still is the exclusive owner of said letters patent of the improvements therein described including all claims for damages and profits for the infringement thereof.

VIII.

That the said Charles E. Cleveland, prior to the said assignment of said letters patent to the plaintiff, and the plaintiff ever since such assignment, has extensively engaged in the manufacture and sale of log handling mechanism embodying said patented invention, and duly marked and caused all its log handling mechanism involving said patented invention to be duly marked with the notice required by law as to the same being patented; and the fact of said improvements being patented is also well known to the trade in general and to each of the defendants. Furthermore the said Charles E. Cleveland, prior to said assignment, and the plaintiff since said assignment of the said letters patent to it, has invested large sums of money in connection with the manufacture and sale of log handling mechanism involving said patented improvement, and in advertising and introducing said patented improvements to the trade of the general public.

In consequence said patented improvement in log handling mechanism has become widely and favorably known to the public and particularly to persons engaged in operating saw and lumber mills, said improvement being recognized by the public and the trade as being of great practical benefit and utility. And the said Charles E. Cleveland prior to said assignment and the plaintiff since then, has manufactured and sold large numbers of said patented improvement in log handling mechanism by the reason of the public generally acknowl-

edging and acquiescing in the exclusive rights of said letters patent; and plaintiff would have continued to do a large business and make substantial profits from its said exclusive rights under said letters patent and would still continue to do so, but for the infringement of said letters patent by the defendants hereinafter complained of.

IX.

That the defendants and each of them, well knowing the premises, but in violation of the exclusive rights of the plaintiff in said letters patent, within six years prior to the commencement of this suit, have each of them knowingly and continuingly, infringed said letters patent; and said defendant Sumner Iron Works manufacturing and selling log handling mechanism embodying said patented improvement to many mills in utter disregard of the plaintiff's exclusive rights under said letters patent, including the mill of the defendant Silverton Lumber Co., and the latter defendant, confederating with the said defendant Sumner Iron Works, having used, and still using the said patented improvement in log handling mechanism in its mill at Silverton, Oregon. Whereby plaintiff has been and still is, and will be as long as said infringement continues, deprived of the just rewards and profits which it otherwise would make under said letters patent, and besides is greatly and irreparably damaged and injured in the premises; and furthermore, the defendants and each of them, by their said infringement, have made, and are continuing to make substantial profits, as plaintiff is

informed and verily believes, which belong to the plaintiff, the amount of which plaintiff cannot ascertain except by requiring the defendants to account according to the order and direction of this Court.

X.

That in order to adequately protect the rights of plaintiff in the premises it is necessary that the defendants and each of them, their officers, agents, employees and confederates, be enjoined pending this suit, and perpetually by the final decree of this Court, from the further infringement of said letters patent or in aiding or abetting in any way such infringement.

WHEREFORE plaintiff prays:

I.

That said letters patent be adjudged and decreed to be valid and that the entire right, title and interest thereof is vested in the plaintiff.

II.

That the defendants and each of them be adjudged to infringe upon said letters patent, and that each of the defendants be enjoined pending this suit, and perpetually by the final decree therein entered.

III.

That a reference be had to a Master to take and report on account of the damages and losses sustained by the plaintiff by reason of said infringement of said defendants. That the plaintiff may have judgment for such damages and losses so found, and determined as by law provided, and as

the Court may deem meet in the premises; and that the plaintiff have the costs and disbursements of this suit and such other and further relief as may be just.

D. J. MURRAY MANUFACTURING CO.

By P. R. HINES,

Its Local Agent at Portland, Oregon, the Office of Said Agent Being Located at Lewis Building, Portland, Oregon.

T. J. GEISLER,

Solicitor and of Counsel for Plaintiff.

Here follows verification.

(Title.)

PLAINTIFF'S CONDENSED STATEMENT OF THE INTERROGATORIES AND ANSWERS THERETO FILED BY THE PARTIES IN THIS CAUSE.

Both parties filed interrogatories under Equity Rule 58, which with respect to those pertinent to this cause and the answers thereto were as follows on behalf of defendant:

1. State what claim or claims of the patent in suit will be relied upon at the trial as infringed. A. Claim No. 12.

2. State what date of completion of invention plaintiff will rely upon. A. According to letter from C. E. Cleveland, date of completion of invention as expressed by claim No. 12 was in the fall of 1908.

3. State whether or not a device as shown in the drawings of the patent was ever constructed and completed prior to the date of filing of the application which resulted in the patent in suit, and if so, give the date of completion of the device. A. A turner as described in claim No. 12 was completed early in January, 1909.

4. State whether similar devices, but of a different construction from that defined in such claim was ever, to plaintiff's knowledge, made or used, or by it caused to be made or used, more than two years prior to the filing of the application which resulted in the patent used on, and, if a device or devices have been made, illustrate and describe fully such device or devices, and give the date or dates of completion of such device, or devices. A. There were many devices of a construction different from that defined in said claim. These devices, however, were not entirely satisfactory, and that was the reason for the patentee's invention. These prior devices are shown by patent to Simonson cited in the defendant's answer. I have no knowledge as to when said devices were completed, outside of information given in said patents.

5. State where the device is located upon which plaintiff will rely in its proof of infringement, and whether or not such device can be inspected on behalf of defendants. A. A device infringing said patent is located at Silverton, Oregon, defendant has admitted such fact, in answer to interrogatories allowed in behalf of the plaintiff.

6. If the machine referred to in interrogatory

5 cannot be inspected on behalf of defendants, describe and illustrate the device sufficiently for all parts thereof to be understood. A. This is covered by answer to interrogatory No. 5.

11. State when a drawing or model embodying said invention was first made. A. The first drawings were made about December 1, 1907, and completed on November 11, 1908, November 3, 1908, October 30, 1908, and October 21, 1908, October 20, 1908, October 23, 1908, and October 26, 1908.

12. State when the patentee first disclosed his alleged invention to others. A. 1907.

13. State when the first apparatus was completed prior to the filing of the application which resulted in the patent in suit. A. About January 1, 1909.

14. State date of invention that will be relied on by the plaintiff at the trial. A. Before December 1, 1907.

15. State the date of reduction to practice of the invention that will be relied on by the complainant at the trial. A. The first log turner, embodying the features covered by Claim No. 12, were completed before January 11, 1909.

16. State whether or not a device as shown in the drawings of the patent in suit was ever constructed, and, if so, give the date of the last construction. A. Yes, the last turner made by the plaintiff was shipped January 2, 1922. The last log turner made by licensee was shipped on Nov. 27, 1922.

17. If answer to interrogatory 3 is in the affirma-

tive state whether or not said device can be inspected on behalf of defendants. A. Turners as shown on the patent drawings were sold to the Standard Box & Lumber Co., Portland, Oregon, National Box & Lumber Co., Hoquiam, Washington, and the McCormic Lumber Company, McCormic, Washington, and presumably can be inspected.

18. If answer to interrogatory 16 is in the affirmative, state whether or not said device can be inspected on behalf of defendants. A. No log turners have been made by plaintiff during ownership of the patent, except for export. Upon information and belief, log turners made by licensees have been sold recently to the Willapa Lumber Company at Raymond, Washington; the Defiance Lumber Company at Tacoma, Washington, and the Pacific-National Lumber Company, at Tacoma, Washington.

16a. State whether the subject matter illustrated in the accompanying photographic print marked Defendant's Interrogatory—Exhibit "B" is or is not a substantial representation of the "usual crooked bed-plates now in use" which are referred to in the words last quoted in line 128, page 2 of the specification of the patent in suit. A. It is.

17a. State whether said exhibit is or is not a substantial illustration of what is known as the Simonson Log Turner. A. This exhibit does illustrate the log turner referred to.

18a. State whether the log turner shown in Defendants' Interrogatory—Exhibit "A" was or was not known to be of public knowledge or use in the

United States before April 13, 1907. A. Yes, according to plaintiff's information, but plaintiff has no definite knowledge.

19a. State whether in respect to log turners substantially as shown in Defendants' Interrogatory—Exhibit "A" infringement of the patent in suit is or is not alleged against defendants or either of them. A. No. In respect to log turners substantially as shown in Defendants' Interrogatory—Exhibit "A," infringement of the patent in suit is not alleged.

Interrogatories on behalf of plaintiff:

1. Specify as to each of the patents cited in paragraph XIV of the answer herein, the particular mechanical feature or combination of parts described therein, on which the defendants will rely on the trial of this case as instances of prior publication of the patented invention here in suit. A. None of the patents designated in said interrogatory are relied upon to show an exact duplication of the construction shown in the patent in suit, but all show, collectively, that prior state of the art upon which said patent was predicated, and show it to anticipate any invention exhibited in the subject matter of Claim 12 of said patent—the sole claim relied upon by plaintiff.

7. State, if you know, whether the log turner referred to in paragraph XV of the answer herein as made by the Hamilton Machinery Company of Peterboro, Ontario, Canada, in the year 1905 is still in use; also state, if this machine is still in use, where the same may now be inspected on behalf of

plaintiff; if said machine cannot be inspected on behalf of plaintiff describe and illustrate by drawings those parts of this log turner and on which the defendants will rely upon at the trial of this cause as embodying the patented invention here in suit. A. The log turner referred to in Interrogatory No. 7, is still in use at Port Moody, British Columbia, in the mill of the Canadian Pacific Lumber Co. at that place.

9. Referring to Fig. 3 of the drawings forming part of the Cleveland patent here in suit; was there at the date of the commencement of this suit, used in the plant of the defendant Silverton Lumber Company, log handling mechanism having a straight bed-plate like that marked 4 in said figure? A. Yes.

10. If so, did said bed-plate have a bearing like that marked 8 in said figure? A. Yes.

11. If so, did a shaft pass through said bearing like the shaft 7 of said figure? A. Yes.

12. If so, did said log handling mechanism also embody a cylinder and piston like 38 in said figure? A. Yes.

13. If so, did the mechanism embody an arm connected to said piston like the arm 39 in said figure? A. Yes.

14. If so, did said arm terminate in a bifurcation straddling said bearing on the bed-plate in similar manner as in said figure? A. Yes.

15. Was said log handling mechanism installed in the plant of the Silverton Lumber Company furnished directly or indirectly by the defendant Sum-

ner Iron Works? A. It was furnished directly by defendant, Sumner Iron Works.

Dated March 13, 1924.

Defendant's Interrogatories Exhibits "A" and "B" to be reproduced photographically and to be made a part of the record.

(Title.)

ANSWER.

To the Honorable the Judges of the District Court of the United States, in and for the District of Oregon:

The answer of the two defendants, Sumner Iron Works, a corporation, and Silverton Lumber Co., to the bill of complaint herein.

Said defendants now and at all times, saving and reserving each unto itself all benefits and advantage of exception which can or may be had or taken to the errors or uncertainties or other imperfections in said bill of complaint contained, for answer thereto or unto so much of such parts thereof as said defendants are advised is or are material for them and each of them to answer unto, each for itself answering says as follows:

I.

As to paragraph numbered I of the bill of complaint, being without knowledge except by said bill of complaint, each of the defendants denies that plaintiff is a corporation; denies that it is duly organized under the laws of the State of Wisconsin

or otherwise; and denies that it has its principal office at Wausau, Wisconsin.

II.

Defendants admit that Sumner Iron Works is a corporation, as alleged in paragraph II of the bill of complaint herein.

III.

Defendants admit that Silverton Lumber Co. is a corporation as alleged in paragraph III of the bill of complaint herein.

IV.

Defendants deny the existence of any right of action or of recovery as is suggested but not alleged in paragraph IV of the bill of complaint herein.

V.

Answering paragraph V of the bill of complaint, the defendants deny, upon information and belief, that prior to April 13, 1909, or at any time, Charles E. Cleveland was the original, first and sole inventor of a certain new and useful improvement in log handling mechanism, not known or used by others in this country before his invention or discovery thereof, and not patented or described in any printed publication in this or any foreign country before his invention or discovery thereof, or more *more* than two years prior to his application for patent therefore hereinafter recited; deny that said invention was not in public use or on sale in this country for more than two years prior to his, the said Cleveland's, application for patent therefor as in the bill of complaint herein recited; and

deny that no application for a foreign patent for said invention was filed more than twelve months prior to the filing of the application for the hereinafter recited patent in this country.

VI.

As to paragraph VI of the bill of complaint, being without knowledge, except by said bill of complaint, the defendants deny that on said April 13, 1909, said Charles E. Cleveland made due application for letters patent of the United States of America, which application was filed on the last-mentioned day under serial No. 489,675, and on due proceedings by the said Charles E. Cleveland and the full compliance by him with all requirements of the law thereafter, viz., on September 7, 1909, letters patent of the United States, No. 933,231, were duly granted to the said Charles E. Cleveland by the Commissioner of Patents of the United States; deny that there was thereby vested in the said Charles E. Cleveland, his legal representatives and assigns, for the term of seventeen years thereafter, the exclusive right to make, use and vend the said patented improvement in log handling mechanism "thruout" the United States and the territories thereof; and deny the allegation contained in the bill of complaint herein "that the said letters patent at all times hereinafter mentioned, were and still are in full force and effect, and the said original letters patent are ready to be produced in court in this cause."

VII.

Being without knowledge, except by said bill of

complaint, the defendants deny the allegations of paragraph VII of said bill of complaint, to wit, that thereafter and prior to the infringement alleged of the said letters patent, or at any time, the said letters patent were, for value received by the said Charles E. Cleveland, duly sold, assigned and transferred unto the above-named plaintiff; and deny that the plaintiff prior to and during the said acts of infringement complained of as committed on the part of the defendants, was, and still is the exclusive owner of said letters patent of the improvement therein described, including all claims for damages and profits for the infringement thereof.

VIII.

As to paragraph VIII of the bill of complaint, the defendants deny that the said Charles E. Cleveland, prior to the said assignment of said letters patent to the plaintiff, and the plaintiff ever since such assignment, have extensively engaged in the manufacture and sale of log handling mechanism embodying said patented invention; deny that they or either of them duly marked and caused all its log handling mechanism involving said patented invention to be duly marked with the notice required by law as to the same being patented; deny that the fact of said improvements being patented is also well known to the trade in general and to each of the defendants, or to either of them; deny that the said Charles E. Cleveland, prior to said assignment, and the plaintiff since said assignment of said letters patent to it, has invested large sums

of money in connection with the manufacture and sale of log handling mechanism involving said patented improvement, and in advertising and introducing said patented improvement to the trade of the general public.

The defendants deny that said patented improvement in log handling mechanism has become widely and favorably known to the public and particularly to persons engaged in operating saw and lumber mills, said improvement being recognized by the public and the trade as being of great practical benefit and utility; deny that the said Charles E. Cleveland prior to said assignment and the plaintiff since then, has manufactured and sold large numbers of said patented improvement in log handling mechanism by reason of the public generally acknowledging and acquiescing in the exclusive rights of said letters patent; and deny that plaintiff would have continued to do large business and make substantial profits from its said exclusive rights under said letters patent and would still continue to do so, but for the infringement of said letters patent by the defendants in said bill of complaint complained of.

IX.

The defendants deny the first allegation of paragraph IX of the bill of complaint, to wit, that the defendants and each of them well knowing the premises, but in violation of the exclusive rights of the plaintiff in said letters patent, within six years prior to the commencement of this suit, have each of them knowingly and continuingly, infringed

said letters patent. Said defendant, Sumner Iron Works, denies the act charged against it severally in said paragraph IX, namely, manufacturing and selling log handling mechanism embodying said patented improvement to many mills in utter disregard of the plaintiff's exclusive rights under said letters patent, including the mill of the defendant Silverton Lumber Co. or otherwise. The defendants, each for itself, deny that it confederated, the one with the other, or with anyone, to use, or that it has used, the alleged patented improvement in manner and form set forth in the bill of complaint herein or in any other wise. The defendants deny that plaintiff has been and still is, and will be as long as said infringement continues, deprived of the just rewards and profits which it otherwise would make under said letters patent; deny that plaintiff is greatly and irreparably, or in anywise, or in any degree whatsoever, damaged and injured in respect to any cause of action in said bill of complaint set out; and each defendant denies that it has made any profits which belong to the plaintiff as alleged in the bill of complaint, or otherwise.

The defendant, Silverton Lumber Co. admits that it owns and operates a Mill at Silverton, Oregon, and that in said mill it uses log handling mechanism manufactured and supplied by the defendant Sumner Iron Works, as the defendant last named also admits; but both defendants, each for itself, deny that said use or manufacture in any wise infringes upon any valid and exclusive right secured to the

plaintiff in the letters patent described in the bill of complaint herein, or otherwise.

X.

Defendants deny that plaintiff is entitled to any remedy for any injury or damage done by them or either of them to plaintiff as alleged in the bill of complaint herein or otherwise; and deny that plaintiff is entitled to any restraining order or writ of injunction, either temporary or permanent, by reason of any cause of action set out in the bill of complaint or otherwise.

XI.

The defendants, each for itself, deny that acts, or any of them, complained of in the bill of complaint herein, are in defiance of the or any rights acquired by or secured to plaintiff, as aforesaid, or otherwise, or to plaintiff's great or irreparable or any loss or injury or by which or otherwise plaintiff has been or is being deprived of great or any gains, profits or royalties which he might or otherwise would have obtained for the alleged unlawful action of said defendant, or that plaintiff has been occasioned large or any damages because of such or any alleged wrongful act of the defendant complained of or at all.

XII.

Each defendant declares that it is informed and believes it to be true and therefore alleges that the description of the alleged invention, as set forth in the specification annexed to said letters patent sued on, is incomplete, ambiguous, uncertain and indefinite, and that the said specification does not de-

scribe the said alleged patented invention in such full, clear and exact terms as to enable any person skilled in the art of science to which it appertains to make and use the same, and that the claims of said patent are uncertain and indefinite and do not correspond to the description in the specification.

XIII.

Defendants deny that the said invention so patented to the said Charles E. Cleveland is of great or any utility or value, and are informed and so believe and therefore allege, that the same has never been introduced into public use, and that the public generally, or any portion thereof, have never acquiesced in nor acknowledged the plaintiff's exclusive rights, or any right to the same or any portion thereof.

XIV.

Defendants are informed and believe and therefore allege that the said Charles E. Cleveland was not the original or first inventor or discoverer of the invention purporting to be covered by the said letters patent, or of any material or substantial parts thereof, and that the same, or material or substantial parts thereof had been described and illustrated in printed publications and patents prior to the date of the supposed invention of the said Charles E. Cleveland, and more than two years prior to his application for letters patent.

Defendants specify instances of such prior publication as follows, to wit:

UNITED STATES LETTERS PATENT.

No. 48,658, issued July 11, 1865, to Isaac H. Coller.

No. 121,355, issued Nov. 28, 1871, to Thomas W. Goodwin.

No. 134,117, issued Dec. 17, 1872, to S. Wheeler.

No. 309,103, issued Dec. 9, 1884, to F. F. Schofield.

No. 382,760, issued May 15, 1888, to J. B. Erwin.

No. 408,760, issued Aug. 13, 1889, to F. Simonson.

No. 448,588, issued Mar. 17, 1891, to Flavel Simonson.

No. 448,590, issued Mar. 17, 1891, to Flavel Simonson.

No. 448,591, issued Mar. 17, 1891, to Flavel Simonson.

No. 448,592, issued Mar. 17, 1891, to Flavel Simonson.

No. 448,593, issued Mar. 17, 1891, to F. Simonson.

No. 483,014, issued Sept. 20, 1892, to J. W. Powers.

No. 531,861, issued Jany. 1, 1895, to C. M. Rhodes.

No. 559,192, issued April 28, 1896, to P. McNerney.

No. 623,002, issued April 11, 1899, to Edward E. Fitzgerald.

No. 694,459, issued March 4, 1902, to J. R. Carter.

No. 759,857, issued May 17, 1904, to B. Botkowski.

No. 852,231, issued April 30, 1907, to D. A. Kennedy.

No. 875,297, issued Dec. 31, 1907, to G. W. Stanley.

No. 905,721, issued Dec. 1, 1908, to J. F. Lindberg & J. Fitzgerald.

No. 992,212, issued May 16, 1911, to W. H. Kratsch.

and other prior patents and publications which

these defendants crave leave to produce at any hearing of this case, upon proper notice and supplemental pleadings, as soon as they are more fully informed in the premises.

XV.

Defendants are informed and believe and therefore aver that all of the features, principles and elements of the alleged improvements of discoveries of the said Charles E. Cleveland were manufactured and used by various persons unknown to defendants long prior to complainant's alleged invention or discovery thereof and were in public use and on sale in the United States for more than two years prior to his application for patent, and defendant asks the privilege of inserting the names of such persons upon discovery thereof, some of said persons being as follows:

The Eastern & Western Lumber Company, located in Portland, Oregon, have now in use such a machine as is above described, and which was installed, and in use by the predecessors of said Company at and before the date hereinbefore in this paragraph set forth.

A log turner, in all substantial and material respects with that of the said Charles E. Cleveland in suit, was made by the Hamilton Machinery Company of Peterboro, Ontario, Canada, in the year 1905; it was delivered to and installed by the Fraser Mills at Port Moody, Canada, not later than 1906; and in consequence, its design and manner of construction had become a matter of common knowledge in the United States for more than two years

prior to April 13, 1909, which is alleged to be the date on which the application for patent was filed by said Charles E. Cleveland.

XVI.

Defendants are so informed and believe and therefore allege that the said Charles E. Cleveland was not the original or first inventor or discoverer of the invention purporting to be covered by the said letters patent, or of any material or substantial parts thereof, and that the same, or material parts thereof, had been in public use or on sale in this country prior to said alleged invention, and for more than two years before the application for said letters patent.

XVII.

Defendants allege that the letters patent sued upon are, in all respects material to this cause, invalid for want of patentable invention.

WHEREFORE, these defendants, having fully answered to the said bill of complaint in so far as they are advised the same is material or necessary to be answered unto, deny that the said plaintiff is entitled to the relief or any part thereof in the said bill of complaint demanded, or any relief whatsoever, and pray to be hence dismissed with their reasonable charges in this behalf most wrongfully sustained, and such other relief as the Court may deem just and equitable.

ATKINS & ATKINS,
COOLEY, HORAN & MULVEHILL,
Attorneys for Defendants.

Here follows verification.

(Title.)

STIPULATION FOR USE AT THE TRIAL OF THE CAUSE.

In the above-entitled cause counsel for the respective parties, hereby enter into the following stipulations, to wit:

1. That at the trial of this cause printed, photostat, or lithographed copies of all reference patents, domestic or foreign, furnished by the United States Patent Office, and pleaded or introduced to illustrate the prior art, to define the scope of the patent, shall be accepted in evidence without certification, when offered by either party, with the same force and effect as if they had been certified, subject only to proof of inaccuracy, if any, and to their competency and relevancy.

2. That at the trial it shall be accepted without proof, as an established fact, that machines substantially the same as that shown in Defendants' Interrogatories, Exhibit "A," were of public knowledge or use in the United States prior to April 13, 1907.

3. That a copy of the articles of the incorporation of plaintiff, duly certified under the hand and seal of the proper official of the state in which incorporated, shall be sufficient to establish the corporate and legal existence of plaintiff.

4. The original assignment of the patent sued on to plaintiff, or a copy of the record thereof duly certified by the United States Patent Office, shall

be sufficient proof of the execution, delivery and contents of said assignment.

Dated Nov. 7, 1923.

T. J. GEISLER,
Counsel for Plaintiff.
ATKINS & ATKINS,
Counsel for Defendants.

In the District Court of the United States for the District of Oregon.

J. D. MURRAY MANUFACTURING COMPANY, a Corporation,

Plaintiff,

vs.

SUMNER IRON WORKS and SILVERTON LUMBER COMPANY, Corporations,

Defendants.

STATEMENT OF EVIDENCE.

A Condensed Statement of All Parts of the Testimony Given in this Cause Essential to this Decision of the Questions Presented by this Appeal, on the Trial of this Case by the District Court on January 3, 1924:

TESTIMONY OF P. R. HINES, FOR PLAINTIFF.

P. R. HINES, a witness called on behalf of the plaintiff, being duly sworn, testified on

Direct Examination.

I am a mining engineer. I am conversant with

(Testimony of P. R. Hines.)

the principles of mechanical construction. At the present time I am representing the D. J. Murray Manufacturing Company, who owns and controls the patents involved in this suit. I have represented them here in Portland for two years. I have read all through the patent here in suit. (The original patent was here offered and withdrawn by consent; a copy thereof already being in evidence as part of deposition of Mr. Cleveland.)

Witness then read claim 12 of the patent and pointed to the elements thereof in the patent drawings and in a model produced in court, namely:

"In a log handling mechanism the combination of a bed plate," that is numbered on the drawings 3 and 4. "Provided at its outer end with a shaft bearing"; which is No. 8; "a shaft extending through said bearing" which is No. 7. "An arm in operative relation with the shaft, said arm"—either 39 or 41—"being bifurcated and straddling the bearing" which is No. 8 "formed upon the outer end of the bed plate; a power cylinder pivotally mounted upon the bed plate; and a piston rod working in the cylinder and connected at its outer end to the adjacent end of the arm."

Q. Do you know of your own knowledge log turners which are made by defendant here with a similar mechanism as illustrated by this model?

A. I do. I saw in August, 1922, a log turner installed at the Silverton Lumber Company, which I know, of my own knowledge, was manufactured by the Sumner Iron Works; that, as far as my

(Testimony of P. R. Hines.)

experience as a mechanical engineer is concerned, is identical in construction. I also know of a similar log turner which I have examined at the Willamette Valley Lumber Company at Dallas, Oregon; also a recent installation at the Columbia River Paper Mills of Vancouver, Washington, all of which I personally verified, and have seen myself. The latter machine was delivered and installed sometime in August of this year. (1923.) In each of these devices the log turner had a straight bed-plate, that part designated in the model and patent as Nos. 3 and 4. Those devices built by the defendant also had the parts 3 and 4 in them, also bearings, like 8 and 9 at the end of the bed-plates, and the shaft passed through the bearings of the bed-plates. Those devices also embodied cylinders like 38 and 40 and piston rods like 38, the same as in this model. Those devices also had an arm like 39 and 41. The one at the Silverton Lumber Company had arms in every essential the same, but in the one at the Columbia River Paper Mills, the push-arm differed slightly from the push-arm shown in the patent in that it was arranged for a nigger bar to come up through. A nigger bar is a part of the machine used to turn small logs, while this machine is usually used entirely on large logs. The machine at the Columbia River Paper Mills was arranged for the nigger bar to come up through the bearing which was split.

Cross-examination.

You have referred in your direct examination to

(Testimony of P. R. Hines.)

bed-plates 39 and 41 in reference to a claim calling for a single bed-plate, namely, claim 12. Please explain what you mean by referring to two bed-plates as being a part of the mechanism described in claim 12.

There are two bed-plates to a machine, but in describing this mechanism combination, we speak of the combination of this one bed-plate and the bearing at the end of this straight line bed-plate, and the forked arm straddling this one; straight line bed-plate, but of course each machine as built has two bed-plates with the construction duplicated. Bed-plate 3 is the bed-plate appropriate to cylinder 38, and bed-plate 4 is the one appropriate to cylinder 40. There is only one bed-plate in each combination. This model does not purport to be a working model, it is not arranged to be connected with steam, as the control pusher valves, etc., are not in question. It does purport to be a working model in so far as it shows the actual construction of the machine in those parts involved in our claims. The skid lifts are not shown because what they call the independent skid lift patents do not enter into this case. This model undertakes to show only those elements and combinations which are called for in claim 12. The mechanism which would be necessary for an operative model for holding the log while they are operating upon the log is not shown in the model. The holding mechanism, that is, the carriage, is not shown. That is separate. When I refer to carriage I mean the

(Testimony of T. B. Sumner.)

mechanism for holding the log while being operated on by the push-arms and the hook-arms.

Witness excused.

Model offered in evidence and marked Plaintiff's Exhibit 10. Articles of Incorporation of the Plaintiff Company offered and marked Plaintiff's Exhibit 11. Certified copy of assignment of the patent from the patentee Mr. Cleveland of the plaintiff offered in evidence and received in place of the original assignment, and marked Plaintiff's Exhibit 12.

Plaintiff rests.

Defendant introduced in evidence a copy of each patent set up in the answer. Same were received without objection and marked Defendant's Exhibits 1, 2, 3, 4, 5, 5½, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19 and 20.

TESTIMONY OF T. B. SUMNER, FOR DEFENDANTS.

T. B. SUMNER called as a witness by defendants, being duly sworn, testified on

Direct Examination.

My age is 68; residence, Everett, Washington. I am vice-president and general manager of the Sumner Iron Works Corporation, one of the defendants. My brother and I started the business when we were boys, and I have been connected actively with the business ever since; there were

(Testimony of T. B. Sumner.)

only two of us in the business, my brother and myself. The business was organized in Minnesota, forty years ago, possibly, a little longer. During the last forty years I have been actively engaged in this business. The Sumner Iron Works is engaged in building sawmill and shingle-mill machinery; engines and boilers; power plants. Nearly everything in connection with a sawmill or a shingle-mill. We have been located at Everett, Washington, thirty-one years last June. I am very familiar with the log turner furnished to the Silverton Lumber Company in this case, all of these machines, you might say, that are being built during the years that we have been building, for the reason that until—well, possibly during the war—my line has always been in the manufacturing end; had very little to do with the selling end until in the last two or three years more particularly. I am acquainted with the circumstances under which the machine referred to was built. Prior to 1913 or '14 we had been building log turners with a crooked bed, and I think it was in 1913 that we suffered a loss by fire; our complete plant was burned, patterns and everything else; from that time on, we changed quite a good many of our designs because we had to make new patterns for the whole line and possibly profiting by the experience that we had had, we made quite a good many changes in our line. I might say we are quite fortunately situated by being in a sawmill town like Everett for the reason that we can watch all of the different ma-

(Testimony of T. B. Sumner.)

chines, as it were, that we built, in operation. A great many times catching some things that were mistaken, and seeing that they were remedied when the next ones were built. The old turner, as it has been brought out, termed the Simonson turner, that is, the turner made by the Challoner people at Oshkosh, they had more or less trouble wtth the crooked bed. In fact, I think they had more breakages with the crooked bed than they had with the arms, and that naturally would turn a man's thought to a straight bed-plate, that is, trying and buildiing a hook-arm or a push-arm with the greatest amount of strength to avoid as much breakage as possible. I might say that I think in the earlier days of the turners that the breakages on the shaft were very few; they occurred usually further up the arm and it has been a constant change all the time as it were, to try to strengthen the different parts to avoid breakages as much as possible. And when you turn to what they term a bifurcated arm, our attention naturally would go to that for the reason that we use it in so many places. If a patent would cover a bifurcated arm, I think it would be safe to say that to-day we would have to eliminate one-half—one-third to one-half—of our machinery, or change the design, for the reason that I can call to mind that very same principle back—must be nearly forty years ago—when my brother and I brought out a thresher machine, and the table that vibrated to separate the grain from the straw was driven by practically the same thing

(Testimony of T. B. Sumner.)

as that. It was not a rotating motion; it was a motion back and forth. That same thing was embodied in many places in the threshing machine. I am stating these things from memory. Had I known this was going to come up, I presume I could have brought some old photographs. Later on, my brother and I helped to design and bring out the first tractor threshing engine for the Minneapolis thresher people at Hopkins. I can call to mind our connection of the cross-head on the bifurcated arm. I can call to my mind a pump that was on the shaft that furnished water to the boiler, was driven by a bifurcated arm. I can go back years ago when we built bobsleds. Our line in Minnesota was more of agricultural machinery. We built bobsleds with oscillating runner; the same bifurcated principle was embodied in that. Take our shingle machines to-day, that we commenced building twenty years ago, the carriage is driven back and forth by a bifurcated arm. You can take our modern machines to-day and it is almost impossible to go and pick out any one of our machines to-day that you don't find the old principle of bifurcated arm, as it were, embodied in some part. Now, I have never seen anything of the turners as built by Geddings and Lewis at the time we were making our changes. I have seen some of their printed matter, but the straight bed came to my mind for the reason that—I think it was in 1906—I think it was in 1906—I was up to the Frazer mill figuring on a job. They were going to rebuild that whole mill, and the old turner, an old turner, I

(Testimony of T. B. Sumner.)

don't want this word Simonson to apply to that particular machine, but that type of machine; there was one of those old turners taken out of that old mill, and afterwards sold and went up to the Port Moody Mills; that was back in 1906 or '07; that had the straight bed; the beds had never broken; that naturally brought the straight beds to our attention. And then, while I would say that our arm, the push-arm and the hook-arm, resembles that a great deal, we made the same mistake there that we were trying to avoid in the crooked bed. That very same turner there has gone on, and you might say improved the old Simonson crooked bed; but what has it done? It has transferred that weak point to the arm; the point that is weakest in the whole machine. It is weak to-day. That is why we to-day have trouble with the arm, because the breakage is too great. I call to mind a part of the Cleveland deposition that said with divided bed the *change* for shrinkages and poor castings were greater, but he has transposed it from that to the arm, the part that should be the most substantial. So, as far as bifurcation is concerned, go back to the horse drawn wagon, it has bifurcated tugs; take the shafts, the thills, has bifurcated thills. I presume the old chariot would show bifurcation; something as old as mechanics; it seems to me, taking two old ideas and putting them into one, no invention there, no inventive genius demonstrated. Possibly I haven't answered your question.

Q. I think your statement is ample, as far as a

(Testimony of T. B. Sumner.)

general statement is concerned. You have said that you did not know the Cleveland machine at the time you adopted the design?

A. No, I wouldn't want to say that; I never had seen one of their turners, but I presume I had seen some of their literature. I wouldn't say that I hadn't, or I wouldn't say that I had, because that is taking too much from memory, but I never had seen anything of their turners. But, as far as the turners with the straight bed is concerned, the one I saw up there years ago was fresh in my mind when we were considering the redesigning of the turner after our fire, and our patterns had all been burned.

Q. When did you first become acquainted with the Cleveland patent in suit?

A. Why, I think that after we had the drawings made of the turners—and we must have seen the advertisement of the Cleveland machine—we sent the whole thing on to Siggers & Company in Washington who had been our patent attorneys for a great many years, to have a search made to see if there was an infringement, and they came back with their report and cited all the different—I don't know—many, many different patents that had been granted, and said that we would not infringe the Cleveland patent if we went on with the manufacture of that machine. We relied, I presume, a great deal on their judgment because they had made good with us all these years in patent matters.

(Testimony of T. B. Sumner.)

Q. When did you get an opinion upon the Cleveland patent in respect to making the machines which you afterwards made?

A. I wouldn't want to say without looking at our records. Our records, of course, correspondence and all with the Siggers Company, would give all of that, I am taking this all from memory; quite a good many years ago.

Witness now identified the report next referred to.

Mr. ATKINS.—I offer in evidence the report of Siggers and Company, patent attorneys to Sumner Iron Works, dated September 7, 1909.

Mr. GEISLER.—What is the object of the offer?

Mr. ATKINS.—For the purpose of examining the witness as to its contents.

Mr. GEISLER.—You propose to use the report as the testimony of an expert in this case?

Mr. ATKINS.—No.

Mr. GEISLER.—What is the object?

Mr. ATKINS.—To refresh the mind of the witness.

Mr. GEISLER.—I object to the introduction of the report for this reason: apparently it seems to be in the nature of an expert report by some attorney in Washington, which of course is clearly irregular under the rules. If they want to produce the expert they must bring him here; he must be present; if he wishes simply to refresh his memory, we have no objection.

(Testimony of T. B. Sumner.)
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(Testimony of T. B. Sumner.)

Q. When did you get an opinion upon the Cleveland patent in respect to making the machines which you afterwards made?

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(Testimony of T. B. Sumner.)

COURT.—You can file it as part of the record in the case. I don't think it is competent evidence.

Marked Defendant's Exhibit 21.

Q. Please state whether you wrote to E. G. Siggers for the report which has just been offered in evidence.

Mr. GEISLER.—I object to the form of the question; the Court expressly stated it was not evidence, merely filed.

COURT.—Tendered in evidence.

Q. Tendered in evidence.

A. I am under the impression that we have—I am under the impression that we have another report from Siggers and Company, long prior to this, and that we had them go more thoroughly into it, and I think this is what brought out this report. I am under that impression.

Q. Have you a copy of that first report you received? A. I presume we have that at Everett.

Q. But you haven't in your present possession?

A. No. I would say that I am just on my way back from California and I haven't gone over this matter at all. I am speaking this just from memory.

Q. State if you know the occasion for writing to Mr. Siggers for a second report, as I understand you have said you did.

A. We had been very careful not to, what would be termed, pirate on the trade, that is, steal some other manufacturer's ideas or designs. We claim that we build to-day the best and the most com-

(Testimony of T. B. Sumner.)

plete line of sawmill and shingle-mill machinery that is built in the world, more modern, and we have tried to build it up by our own efforts, and attention and opportunities in the past and have been very careful to not try and steal someone else's ideas, and I might say in forty years we have been in business, this is the first time we were ever in court on infringement of a patent. We have endeavored to keep away from that, and, well, play the game fair, you might say, in business.

Q. Did you receive any advices or notice from the plaintiff that you were infringing the Cleveland patent in suit?

A. Yes, I think we had a letter shortly—I would imagine shortly after the Murray people had purchased the patterns and drawings, and whatever it was from the Geddings & Lewis people, and saying that—calling to our attention that we were infringing, and I think we answered them back and cited the information that we had from Washington, and I would imagine that that was two or three or four years ago, sometime ago anyway; and I think that was the last that we ever heard from them until the action was commenced on this turner down here at—here in Oregon.

Q. Do you remember what reply, if any, you made to the first notice you had of an alleged infringement in this case?

A. I wouldn't want to take that from memory without seeing a copy of the letter, but I know

(Testimony of T. B. Sumner.)

that,—well, possibly I hadn't better say because it would be taking it too much from memory.

Q. In arriving at the construction of the log turner as you built it, and which is claimed to infringe the Cleveland patent, did you, or did you not, copy the Cleveland design?

A. Well, it is very similar to the Cleveland design; very similar for the reason that the design in the construction was old; we had been building it for years.

COURT.—What counsel wants to know is, whether you had before you at the time you manufactured, the Cleveland design and copied it?

A. No, we didn't; didn't have it.

Q. The knowledge of the Cleveland patent, then, came to you after you had designed your machine?

A. No. I wouldn't say that; I wouldn't say that. As I say, we might have seen some of their printed matter, but I never had seen one of their machines.

Q. At the time you made your design, did you know of the existence or the scope of Claim 12 of the Cleveland patent?

A. I never had seen a copy of the patent.

Q. Did you know that that particular feature was covered by the Cleveland patent?

A. No, sir; had not seen any copy of the patent at all. A great many times we see the printed matter on any particular machine, but don't go thoroughly into it to see whether it is covered by patent, and if so, what part.

(Testimony of T. B. Sumner.)

Q. I hand you a copy of the photograph, and ask you to state if you know what it represents?

A. Yes, that is the—as I understand it, that is the old machine that I saw up Frazier River about the date I mentioned. They took it out of that mill, and it was sold, and went up to a mill at Port Moody where this is now, and that was the same one taken out from the Frazier River Mills. That photograph correctly represents the log turner which I saw in 1906.

Q. Please explain what the details of the log turner as shown there are?

A. Why, this merely shows the principle of the straight bed and an old type of the push-arm. This shows the push-arm.

Q. Will you compare that with the model, plaintiff's model here, and indicate the parts that are shown here that correspond to the parts of the model. I may add, that the members of the model are numbered, and you may refer to them by number if you wish.

A. The only similarity would be the straight bed, that is, the straight bed here and this straight bed there. This has two bearings in the bed, and that has one. Referring to the photograph, Defendant's Interrogatory, Exhibit "A," that shows a straight bed-plate?

Q. What do you mean by straight bed-plate?

A. Why, without crooks and curves, and this shows a straight bed-plate, with two bearings instead of one, and a trifle wider on the shaft end than

(Testimony of T. B. Sumner.)

on the cylinder end, but running nearly parallel the two sides. This bed-plate carries the cylinder, with trunnions on each side of the cylinder or in the receptable of the bed-plate on each side, held down by a cap. The front end of the bed-plate also carries the shaft. The shaft would be parallel with the center of the trunnion on the cylinder. The purpose of the cylinder and shaft in this machine was to avoid the breakage.

Q. I am speaking of the cylinder and shaft; what was the relationship between the cylinder and shaft? A. I don't catch your meaning.

Q. The shaft carried an arm, did it?

A. Oh, yes, the shaft carried an arm.

Q. What was that arm called?

A. The arm was actuated by a piston rod working in the cylinder.

Q. With what effect upon the shaft?

A. Making the shaft rotate.

Q. By rotate do you mean rock? Was it a complete rotation or rocking motion?

A. Rocking motion.

Q. Was the operation of the log turner shown in this photograph substantially the same as, or different from, the log turner shown in plaintiff's exhibit model?

A. I would imagine that the distance from the center of the shaft to the center of the pin in the upper end would be about the same as the distance from the center of the pin in the upper end of the arm, to the end of the cylinder, would

(Testimony of T. B. Sumner.)

be governed a good deal by the length of the cylinder to provide for sufficient stroke; that would be practically—I imagine immaterial.

Q. But is it the same substantially in operation?

A. Substantially the same.

Q. Again referring to this photograph, please state whether the piston rod and the push-arm move in the same, or different, vertical planes?

A. I don't think it makes any difference.

Q. I am talking about this photograph here; does that move in the same vertical plane.

A. Oh, that is the same according to the length of stroke of the cylinder.

Q. That is the axis of the rod, and the axis of the arm—

A. Are practically the same.

Q. State whether there is any advantage in locating these two members and organizing them so as to work in the same vertical plane, as compared, for example, with the sketch shown in Mr. Cleveland's deposition?

A. I don't *think could* be any particular difference in that. I don't see why there would be. You get a little more movement, of course, by the length of the arm and the length of the cylinder but that, I imagine, would be immaterial.

Q. I hand you the deposition in evidence of Charles E. Cleveland, and refer to the sketch on page 9 thereof, and will ask you to compare that sketch with the photograph you have in hand and state the difference, if there is any, between the two machines, shown there.

(Testimony of T. B. Sumner.)

A. Well, this is the old type bed; what we term the crooked bed; and this blue-print, photoprint here, shows a straight bed. And what they have done, is to sort of transpose the crooked bed to the straight bed, and the straight arm to the crooked arm, and transfer the breakage of the bed to the breaking of the arms. They have overcome the breaking of the bed by making this straight bed and have transferred, you might say, the breaking strain to the crooked arm; that is what this has done.

Q. Do you wish to be understood as stating that the photograph, Defendant's Interrogatory, Exhibit "A," differs from the sketch shown in the deposition of Charles E. Cleveland, page 9, only in respect to the different shape of the bed-plate?

A. Well, in this sketch—that shows the crooked bed, and the single box—bearing, you might say; this is old Simonson type with the crooked bed, and one bearing, and this photograph, photo blue-print, shows a straight bed and two bearings shown here on the shaft. The two bearings shown in Exhibit "A" are located upon the end of a straight bed-plate, as I understand it. These bearings carry the shaft. The arm is keyed to the shaft. The arm with respect to the shaft in this Exhibit "A" is located between the bearings. The purpose is to cause a rocking of the shaft by the operation of the piston rod upon the upper end of the arm.

Q. The longitudinal axis of the piston rod, and

(Testimony of T. B. Sumner.)

the longitudinal axis of the arm, the two lines are both in the same vertical plane, are they not?

A. The piston, and the piston rod in the cylinder, as they operate the arm, of course they naturally—this point here rises and falls, which is provided for by the trunnion on the cylinder, allowing the cylinder to oscillate, as it were, to keep the line of the piston rod, and the upper connection in the push-arm, or the hook-arm, perfectly in line. They are in the same direct line, the piston rod and the axis of the arm, up here. They vary, rise and fall, but always in direct line.

Q. And they work in the same vertical plane, don't they? A. I presume so.

Q. Is there any advantage in locating the connection between the shaft and the push-arm in line with the longitudinal axis of the piston rod?

A. Why, the upper end of the arm, either hook or push arm, would want to be direct in line with the center of the cylinder, so as the piston rod would move back and forth there wouldn't be any cramping or bending of the piston rod, so they would naturally be in line; that is, the upper end of the arm with the center line drawn through the center of the cylinder; that would be practically necessary connection.

Q. Now if the connection between the shaft and the push-arm shown in Exhibit "A" were divided, what would be the effect, if any, upon the operation of that machine?

A. Be none whatever. There would be no dif-

(Testimony of T. B. Sumner.)

ference in the operation of a push or hook arm this way; whatever way it might be connected at the bottom of the shaft, the movement would be exactly the same. The distance that it would travel through space, of course, would be governed by the length of cylinder and the stroke of the piston.

Q. What would be the effect on the strength of the push-arm by bifurcating it at the end which is connected to the shaft?

A. If this line here had been straight on each side for the same amount of metal, it would develop greater strength. We have found out, in the last two or three years experience here is where we are having breakages. We have dropped this type entirely; for this reason it was folly to try to get away with a crooked bed and transpose to crooked arm. Our arms are now made straight, like this, to do away with this type here, which has proven a detriment instead of an advantage. The turners we build now are not built with any such type as this.

Q. Do you mean to say, then, this bifurcated arm is stronger or not so strong as the straight arm shown in Exhibit "A"?

A. You change that. You let that run straight up there, and put it between the bearings the same as our turner to-day, and it is a stronger turner than that is.

Q. Is the bifurcated arm stronger or weaker than the straight arm?

A. The straight arm is the stronger, that is why we straighten the bed.

(Testimony of T. B. Sumner.)

Q. How do you arrive at that conclusion?

A. By the breakages that we get for repairs.

Q. You have found in actual practice that the straight arm is stronger than the bifurcated arm?

A. I might answer that by saying I just came from Samoa, California, where they have one of these turners. The master mechanic says, "Don't send us any more of this arm, that is straight up through, because this is the second or third one you have sent us."

Q. Then from actual experience in manufacturing, you know this?

A. I saw them down there last week.

Q. You find that this bifurcated arm is subject to breakage which the straight arm is not subject to? A. As built there it is a mistake.

COURT.—You use the bifurcated arm, do you? Are using it now?

A. I may say that we are still building straight bed but with two boxes similar to this, and the arm is in between the two boxes similar to this, and the arm is in between the two boxes instead of straddled outside. This is done on turners we are now building to avoid this breakage.

Mr. SNOW.—That is to say, you are now building a straight arm and not a bifurcated arm.

COURT.—What I asked is whether you are building this kind or not—like that?

A. The bed is very similar to that.

COURT.—I don't mean bed, but arm.

A. The arm differs from that. May I show

(Testimony of T. B. Sumner.)

you a photograph of that, that possibly could catch it quicker. I don't know particularly bifurcated arm.

COURT.—Yes, if you have one, I will be glad to see it. I understood at the beginning of this trial there was no controversy but what the instrument or machine manufactured by the defendant company was substantially the same as complainant's patent. That is what I understood and the question in the case is whether there was any invention in complainant's patent in view of the prior art. Now I understand this witness is not using this.

Mr. ATKINS.—That is correct, your Honor, but they did build a machine that was substantially the same as this.

COURT.—Not building now.

Mr. ATKINS.—They are not building it now. That is the point, and the reason, as the witness has said, that they are not building it is that that type of machine is subject to breakage.

Mr. SNOW.—Just one question, Mr. Sumner, to clarify the record: You spoke of the bifurcated arm similar to that shown in plaintiff's model as breaking. At what point do these breaks usually occur in the arms? A. In the curves there.

Mr. SNOW.—In the shoulder of the bifurcation?

A. It is very seldom for an arm to break in the shaft. It is a small thing to hold the arm to the shaft, but the trouble is to get it strong further up where the breakage has occurred.

(Testimony of T. B. Sumner.)

Q. Can you detach that photograph?

A. I can have it taken out.

COURT.—Let me see, you have two bearings now on the shaft.

A. The bed carries two bearings; the shaft is in two bearings; but it is not on each side of one bearing.

Q. It doesn't straddle the single bearing?

A. It doesn't straddle a single bearing.

Q. This photograph, as I understand, represents the construction of the log turner that you are now making? A. Yes, sir.

Photograph offered in evidence and marked Defendant's Exhibit 22.

Mr. GEISLER.—I would like to ask what is claimed for this particular photograph? It is not to contradict the admission of infringement?

Mr. ATKINS.—It is to show the present construction of machine made by them and also to show some of many variations that can be made from the construction which is defined in Claim 12. There are already shown by testimony and exhibits on file certain variations, and this is one more added to them, as showing variety of operative construction that differ from the construction defined in Claim 12.

Mr. GEISLER.—This is variation from Claim 12 which you are now making?

Mr. ATKINS.—Yes.

Mr. GEISLER.—I don't think it is material but it will be before the Court.

(Testimony of T. B. Sumner.)

Q. Please state whether the construction shown in Defendant's Exhibit 22 had any effect on breakage of the push-arms or hook-arms in your machine, and if so, what effect?

A. I thought that what you wanted to bring out was one of the points made in deposition of Mr. Cleveland that the shape and construction of the arm as shown there was an improvement and something better and newer and that was why I referred to the points that made it weaker instead of stronger as brought out in the deposition of Mr. Cleveland. Now, this is a far stronger, more substantial arm, hook-arm and push-arm, because we have eliminated the curves, as I said, which we were trying to do in the bed. There is no new principal involved.

Q. But this is the arm, the push-arm, shown in Defendant's Exhibit 22, which you testified to be stronger? A. Yes, sir.

Q. Than the push-arm in plaintiff's patent?

A. Yes, that is why we have changed the bed, because we have had so many breakages, we adopted the construction shown in Exhibit 22 to overcome these objections.

Cross-examination.

I have seen a great many turners operated.

Q. Did you ever operate it yourself?

A. I have tried it. I am not an expert, though. I couldn't do as well as a sawyer.

Q. Have you any theory as to what causes the

(Testimony of T. B. Sumner.)

breakage of a push-arm or a hook-arm in the operation of a log turner?

A. I have a theory for everything I see in mechanics; whether they are right or wrong, that is neither here nor there.

Q. Did you ever see the patent granted to William M. Wilkins, December 27, 1904, for a log turner, No. 778,522?

A. No. I never knew Wilkins ever worked on that line.

Q. I call your attention to this patent and ask you to read the sentence beginning on line 76 to line 85 on page 1.

Mr. ATKINS.—Is this patent to be introduced in evidence? I don't want him to read a part of a document unless it is in evidence.

Mr. GEISLER.—Can all go in evidence if you like.

A. Where do you want me to commence? Where these red lines are? "The upper surface of the sides of the crowding bar, H, are rounded from the inside faces of the opening h′ thereinto the lower edges of the wings h2 thereon as illustrated in Figures 1, 2 and 3, so that when the crowding bar H is forced against a log moving longitudinally on the saw carriage B there is no surface on the crowding bar to catch on a knot or other obstruction on the log and thereby be forced sidewise and broken."

Mr. GEISLER.—I will offer the patent in evidence.

A. I didn't catch the drift of it; it might be a

(Testimony of T. B. Sumner.)

lowering device, board lowering device, as well as logging.

Mr. ATKINS.—If your Honor please, that patent which has been presented to the witness and which is offered in evidence, as far as I can detect, is wholly immaterial. I have no objection as it stands now, but it has been submitted to the witness and myself for the first time now.

A. That is all right.

Mr. ATKINS.—I reserve the right of objection.

A. I think I see the drift of it; let them put it in; I see the drift of it.

Marked Plaintiff's Exhibit 13.

Mr. GEISLER.—I would like your Honor to read the lines down here that are marked.

Q. You have noted that the patentee Wilkins in the specification in those lines to which I have just called your attention speaks of the fact that in his construction there it shows a sort of arrangement for pushing against the log. "There are no surfaces on the crowding bar to catch on the knot or other obstruction on the log and thereby be forced sidewise and broken." You remember that expression?

A. I wouldn't care to pass on that reading until I had consulted the drawings.

Mr. ATKINS.—I object on the ground that the witness has not inspected it and is not acquainted with it and ought not to be expected to pass on it without an opportunity for examination.

A. Never saw it before, never heard of it.

(Testimony of T. B. Sumner.)

Mr. GEISLER.—The object is, Mr. Atkins, I just want to ask the witness as to whether his theory as to the cause of the breaking of the arm agrees with with this patentee; he sets forth that it is due to the side thrust brought about by some protruding surface on the log hitting it and breaking it.

COURT.—Ask him that.

Q. Is it your idea that the breaking of an arm, be it push-arm or hook-arm, is caused by some protrusion on the log striking against the arm as the carriage moves by it?

A. What a question that is! What kind of a sawyer have you got if he is going to run his carriage and the arms of the Simonson out? Absolutely absurd!!

Q. You don't agree with the statement here of patentee Wilkins?

A. I wouldn't pass on that until I have been through the drawings; something I never saw before, never heard of.

Q. That isn't the question, Mr. Sumner. This patentee states it to be his opinion that the breakage—

A. What is the date of it? 1904—his opinion couldn't have been very valuable; never heard of it and got out in 1904.

Q. This patentee states it to be his opinion that the breakage of an arm is caused by the fact of there being some protrusion on the outside of the log which hits against the arm, gives the arm a side thrust and so breaks it.

(Testimony of T. B. Sumner.)

Mr. ATKINS.—It seems to me that this patent is wholly irrelevant; it expresses only the theory of a witness who is not present.

COURT.—Ask him what the facts are, if he knows; not what somebody else's theory is.

Mr. ATKINS.—That is the point I wish to make exactly.

Mr. GEISLER.—I just wish to ask, if the Court will permit it, whether he agrees or does not agree with this statement as to what causes the breakage of the arm.

A. I will discuss the operation of the Simonson turner with you in connection with skid lifts and carriage and all, if you will keep something away from me that I know nothing about. I don't know anything about this man Wilkins, whether he is an authority or whether it is some visionary thing. The patent office is flooded with—

COURT.—Never mind. How do you account for the breaking of the arms—what causes them to break?

A. There are many different causes.

Q. Isn't it a fact that the movement of the log past the arm, if there was any protrusion on the log, and the log is moved by the arm, while the arm is thrown forward, that such striking of the protrusion of the log on the arm would tend to break the arm?

A. In what operation? In putting off or rolling off?

(Testimony of T. B. Sumner.)

COURT.—Moving the carriage alongside the arm?

A. Why, the arms are supposed to be down out of the way when the carriage moves, absolutely; a man would be crazy who undertook to operate a carriage with the arms up like that.

COURT.—Before starting to move?

A. Absolutely. A man wouldn't hold his job fifteen minutes, a sawyer.

Q. Do you wish to tell the Court that the arms are never moved during the travel of the carriage?

A. Oftentimes they are up there, and their movements back—if you are a rapid sawyer enough to do so, oftentimes, but it isn't the practice. It would cause an arm to break in a different way, you would find the fracture this way on an arm, instead of crosswise.

Q. Take your Exhibit 22. When did you make that log turner?

A. Some time during this year it was brought out in the manufacture.

Q. Have you built such a log turner? A. Yes.

Q. When did you build it?

A. Why, I couldn't tell you the date. If a man would go to Tacoma you can see there one in operation, I think, in one of the mills there.

Q. When did you install it?

A. That I couldn't say.

Q. Did you only put it in this year?

A. It is manufactured this year.

Q. What part of this year, what month?

(Testimony of T. B. Sumner.)

A. I couldn't tell you without looking at our records.

Q. Have you any idea as to when?

A. No, I couldn't tell you.

Q. Has that log turner been operated, actually operated?

A. I haven't been there. I presume in operation. I don't know. I haven't been there since I was with the man who sold it.

Q. How do you know then that by that structure you overcome the breakage on the bifurcated arm?

A. By changing many types of the old ones that come in, old ones where we have had breakages; constantly taking out that curve.

Q. That is merely your theory?

A. They are in practice, and have not broken.

Q. That log turner has not been operated?

A. We have changed the type of that arm on old turners that we have had.

Q. Where have you put in substitutions for a forked arm, and put in a straight arm, as I understand it? Have you?

A. I thought I explained that to you, that we have been gradually taking this crook out and bringing this up straighter here, to do away with breaking.

Q. That would be a forked arm, would it not?

A. The bottom part has not been changed, the part that is on the shaft, that is, in repairing the old-timers.

Q. How did you come to build the log turner—for the Silverton Lumber Mills at Silverton, Oregon?

(Testimony of T. B. Sumner.)

A. One of our salesman sold a turner. The order came in and went through the shop in its regular course.

Q. Have you built recently a log turner for the Columbia River Paper Company at Vancouver, Washington?

A. Yes, we sold them a turner this summer. The construction of that log turner is very much like the model right there. Some little difference in the shape of the arms, or, if I call it to mind, it has a divided bed for the nigger, hasn't it, Hines?

Q. I show you here a photograph of a log turner, and will ask you whether that is not a photograph of the log turner installed by you at Vancouver, Washington?

A. Let me see the one of the other bed. I would imagine that—I would imagine that that would be that turner down there. I haven't got any reason to dispute it. It only shows one bed; whether the other one was a broad bed with two bearings—I would presume it to be the turner, I haven't any reason to dispute it. We sold them a turner, anyway.

Mr. GEISLER.—I offer these two photographs in evidence.

Marked Plaintiff's Exhibits 14 and 15.

COURT.—Do those show a bed-plate with one bearing?

A. Yes.

COURT.—Shows bed-plate with one bearing and

(Testimony of T. B. Sumner.)

push-arm bifurcated, and the bearings on either side of the bed-plate bearings. Is that right?

A. No, I think that is wrong.

COURT.—Isn't the bed-plate bearing in between the push-arms?

A. Yes, there is the bed-plate, and the bearing is in here, and this arm comes down bifurcated.

COURT.—The same as that?

A. Practically the same as that.

COURT.—Now, let me see 22. In this one, in 22, you put the bearings of the bed-plate on the outside of the push-arm bearings?

A. Yes.

Q. Now, look at Exhibit 15. That shows a hook-arm. A. Well, that shows a hook-arm.

Q. In that same construction at Vancouver, Washington?

A. Yes, but I thought the machine down there was a combination machine with wide bed and two bearings.

Q. This is a photograph of that hook-arm in that machine, is it not?

A. Hines, that isn't the combination bed.

Mr. HINES.—No, it isn't. I had in mind it was.

A. No, you are mistaken. This is all right.

Mr. HINES.—I think the skid lift positively identifies the machine.

Mr. ATKINS.—Counsel for plaintiff is requested to state whether he is proposing at this time to prove other alleged infringements than the one that

(Testimony of T. B. Sumner.)

is alleged to have been made by the Silverton Lumber Company?

Mr. GEISLER.—Incidentally, but that is not the entire purpose of this examination.

Mr. ATKINS.—The proof of other alleged infringement should be reserved for the accounting in the case, and that is the only reason I object to the question, not to delay the case at all, but he may have ulterior motives.

Q. Now, I ask you to look at the push-arm construction as shown in this photograph, Plaintiff's Exhibit 14, and state whether it is not a fact that that shows a bed-plate—straight bed-plate—with a bearing at the end of the bed-plate and push-arm astride of the bearings?

COURT.—That is what he said a moment ago.

A. Yes, but let me call your attention to just what I say; we are taking out a great deal of these crooks. This seems to be a later pattern, because a smaller turner, for you will see a great many of these crooks have been eliminated, which Mr. Cleveland claimed was one of his wonderful inventions.

Q. When was that order for Vancouver, Washington, taken?

A. You are not fair to me, when I told you I couldn't tell. I haven't any records here.

COURT.—Say you don't know, then.

A. No, I don't know.

Q. Do you know when it was installed?

A. I do not.

(Testimony of T. B· Sumner.)

Q. Is it not a fact that that particular construction was installed this year?

A. Yes, it was installed this year.

Q. And is it not a fact that it was installed this year as late as August? A. I don't know.

Q. Why was it, since you claim you had a different and better construction which affected the push-arm and the hook-arm, you nevertheless, as late as this year, followed the construction of the Cleveland patent here in question?

A. I think the drawings and the details and all for that ten-inch Simonson was gotten out about two years ago, and it is a great expense to go and get out a whole set of drawings, detailed specifications and all, and if I remember that, it was a rush job, and these drawings were taken into the pattern shop and the job was made that type, and I presume these drawings and specifications probably were made two years ago, maybe three years ago.

Q. Did the particular order here, which we are considering, I mean furnished by you, for a log turner for the Vancouver Company, require you to put in this particular type?

A. No, I think the order would read ten-inch log turner with certain sized shaft, certain length shaft, hook-arm, push-arm, and the requisite number of helper arms. That would be the way the order would naturally come into the shop. I have no knowledge or recollection of anything in connection with this particular order. It comes in and goes through its natural channels, and I would know of the sale, and

(Testimony of T. B. Sumner.)

I will see it go through the shop, but as for the details, I wouldn't know anything about them.

Q. Now, you don't wish the Court to understand that you got this order two years ago?

A. Oh, no.

Q. When did you get the order?

A. Sometime this year.

Q. After this suit had been brought?

A. I couldn't tell you. I wouldn't say without looking at our records. I don't know.

Q. Wasn't this suit commenced a year ago or more?

A. Might have been, I wouldn't say.

Q. Were you called upon to furnish this particular kind of log turner as shown by this photograph?

A. I answered that question before, that same identical question. We sold them a ten-inch log turner with a certain sized shaft, certain length of shaft, a hook-arm and a push-arm, and probably a certain number of helper arms, what that was I don't know.

Q. In furnishing this particular log turner for Vancouver, Washington, you intended to give them the very best that you knew of, as far as log turning outfit was concerned?

A. I presume that would be the argument of one of our salesmen.

Q. I understand you to have testified that you originally built log turners with crooked beds?

A. Yes.

(Testimony of T. B. Sumner.)

Q. When did you discontinue building log turners with a crooked bed?

A. I told you distinctly that when we had the fire and all of our patterns, the whole plant was wiped out—there were six acres of just debris—

COURT.—When was that?

A. I think 1913. If I remember right, the 15th day of April, 1913, taking it from memory.

Q. All of your patterns were destroyed at that time? A. Every piece.

Q. You had to build new patterns for your future work?

A. We had all of our tracings in the vault, and the office didn't burn, but the rest of the plant was wiped out entirely. All of the tracings of all of our drawings being in the vault were not damaged. Then from that we would take and make the changes when we put a big crew of pattern-makers back to work, to get back into the manufacture. And I might say that we burned out in 1913 and you take the history of our business for the last twenty years, and you can't pick out from the volume of business the year we burned out.

Q. When you changed to build your new patterns after the fire, then you made the change from the crooked bed to the straight bed?

A. I think that is my recollection.

Q. Why did you make that change?

A. To make it better.

Q. You testified that you saw a straight line bed up in Frazier River, Canada, at what time?

(Testimony of T. B· Sumner.)

A. I think it was 1906, taking it from memory, because I think the mill was rebuilt and started in 1908, and this was long prior to the rebuilding of the old Frazier River mill, just above New Westminster, and this turner was taken out from the old mill and resold, and went to Port Moody.

Q. What caused the long interval between 1906 and 1913, when you had that fire, as I understand, before you made the change from the crooked bed to the straight bed?

A. If you understand manufacturing at all, you will know that when you bring out a machine you start in and you make your drawings and you make all of your details and your specifications, you get your equipment, patterns, and everything else, all ready to manufacture. You have your flasks all made in the year that fit those particular drawings. It is a great expense to stop and abandon all of these patterns and jigs and drawings, and bring out something new.

Q. Can you state what year you put in the Silverton log turner? A. No.

Q. Was that before the fire?

A. Why no, it wouldn't be that turner. What a silly question! Would it be that turner before the fire, when I told you the pattern had burned, and I told you we built a crooked bed prior to the fire.

Q. Now, with reference to the fire, how long a time after the fire before you built and delivered the Silverton log turner? A. I don't know.

(Testimony of T. B. Sumner.)

Q. When you built that Silverton log turner you had already seen advertising matter of the Cleveland patent here in suit?

A. I testified that I presumed I had seen the printed matter.

Q. And you knew the principles of construction there involved, didn't you?

A. I wouldn't answer that. I wouldn't say whether I had or not.

Q. You knew that it consisted of a straight bed, it had a straight bed; but you know the Cleveland patent had a straight bed?

A. I have answered that before. I said that I presumed that I had seen some of their printed matter, but I never had seen the Cleveland turner.

Q. Did the printed matter show that it had a straight bed?

A. Why, you have some of their printed matter. That would tell you whether it showed.

Q. Mr. Sumner, I am talking about the printed matter which you saw of the Cleveland patent.

A. I couldn't tell you all that, for the reason you are asking me to say things on the stand that happened back years ago. Now I told you I presume I had seen—

COURT.—If you don't remember, say so.

A. I don't remember.

Cross-examination interrupted for the purpose of further direct examination, and introducing some exhibits.

Mr. Sumner, in your direct examination yester-

(Testimony of T. B. Sumner.)

day you referred to the use by your company of bifurcated arms in the manufacture of different machinery, and that you had drawings of such machinery, or photographs. I now hand you three photographs, and will ask you to state what they are.

Mr. GEISLER.—I object to these, on the ground, as I understand, it is merely to show the prior construction of a forked arm, *per se,* which has nothing to do with this issue, because, as your Honor knows, in a combination claim it is assumed that the elements are old.

COURT.—It will be admitted for what it is worth.

Marked Defendant's Exhibit 23.

A. While this photograph number 265 shows a shingle-machine that we termed 1906—while that machine is designated as 1906, for the reason it was brought out and perfected prior to 1906, and as the machine had been advanced later on and improved, they took different numbers, and this is one of the first and the original, showing bifurcation of driving the carriage forward and back.

Q. This photograph that you have just referred to, shows the bifurcated arm, does it? A. Yes.

Q. Can you identify that by pencil mark?

A. Yes.

Q. The machine shows on this Exhibit 23, you said, was made prior to 1906?

A. Yes, that design. That machine there, I wouldn't say, was made in 1906, but that type, that

(Testimony of T. B. Sumner.)

number, that particular kind of machine, was made. Now, I don't know just when this photograph was taken. In going through, we have built, I think, nearly six thousand shingle-machines, and I couldn't identify. That represents a machine built by us prior to 1906. Photograph 760 shows bifurcated arms that connect to the different style of rachets that we have used off and on ever since 19— although brought out in 1904, applies to what we call 1906 and machines since.

(Introduced in evidence and marked Defendant's Exhibit 24.)

This photograph represents a swing trim, or trim with bifurcation on both ends. I think that design was brought out years and years ago. I couldn't identify just the year, but I would think along nineteen hundred two, three, four, five or six, somewheres along. I can swear it represents a machine built prior to 1906.

(Offered in evidence and marked Defendant's Exhibit 25.)

Q. I hand you an exhibit model, and ask you to state what it represents, you need not go into details of it, but does it, or does it not, represent the subject matter of Claim 12 of the Cleveland patent? A. Yes, I think it does very clearly.

(Offered in evidence and marked Defendant's Exhibit 25.)

Q. I hand you another exhibit model, and ask you to state what that is.

A. That is another log turner that resembles the

(Testimony of T. B. Sumner.)

old machine that I referred to yesterday, somewhat, pretty clearly, in design and principle, the straight bed-plate, and the single connection to the shaft, that I saw in Canada.

(Offered in evidence and marked Defendant's Exhibit 27.)

Q. Charles E. Cleveland, in his deposition, answering to cross-question 21, states: "I have seen the old Simonsen turner with the piston attached to a straight arm, with a solid boss in which the shaft passed through." Please state what you understand by that statement.

A. Why, that the arm, it has the—well, we would term that a hub, and when he refers to a boss, I would interpret that to mean the hub, and that is the extension on each side, or one side, or either side, as the case might be, which would be a boss. I can explain that.

Q. I hand you a model, and will ask you to state what it represents, if you know?

A. That is the arm. Now we would term that the hub, and if we were going to designate we would say with a boss on each side, with a distance through the eye, a given distance, whatever it might be, through the eye. That is the straight arm with a solid boss, as stated by Mr. Cleveland in his answer, it could be termed either a solid boss, or the hub, which ever way they wanted. It is a straight arm, with a boss.

(Offered in evidence and marked Defendant's Exhibit 28.)

(Testimony of T. B. Sumner.)

Cross-examination (Resumed).

Mr. Sumner, you testified yesterday that you saw this Frazier River construction, which is shown by that photograph Exhibit "A," in 1906, and in 1913 you had your fire? A. Yes.

Q. In that fire your patterns for your log turners were destroyed? A. Yes.

Q. You kept back reserved, I should say, the drawings from which the patterns had been made?

A. Yes.

Q. You had these drawings changed by your designers so as to eliminate breakage of arms, make them stronger; is that right?

A. We didn't have those drawings changed. We had a new set of drawings made, they didn't change the old drawings. We would have no record. These drawings differed from the drawings we previously had in the shape of the bed, and I presume in the shape of the arm. The old set of drawings showed the patterns which had been destroyed, they had a crooked bed. The new drawings had a straight bed. The log turner turned out from the new drawings made after the fire had a straight bed and a structure very similar to that shown in Mr. Cleveland's patent here. I have no recollection of these log turners in operation for the reason, as I said before, my duties have always been in the manufacture, in the plant end of it. My brother was the salesman and he was the one that visited the different mills.

(Testimony of T. B. Sumner.)

Q. When was the first time you saw the log turner built by the Cleveland patent?

A. To the best of my knowledge, as I remember it, the only time I have seen a log turner built along the lines of the Cleveland patent, was one that I was looking at down at Eureka, built and furnished by the Allis Manufacturing Company, who I understand are building under license with these people. I think that was—well, it was during this year. I couldn't, without referring to some of my notes, expense accounts or something like that, designate the date. Now this—just let me think a minute, I think our records show that the Allis people have furnished six log turners built under the license which they have from Murray, and I am almost positive that that turner at Doliber-Carson, in Eureka, is the only turner that I have ever seen, built like the Cleveland. Now, that is taking it just from memory. I have not personally studied the patents which were offered in evidence to show the prior art, the patents which you cited in your answer.

Q. Are you familiar with them?

A. Why, I don't know—I don't know how best to answer that, because the word familiar might cover a good deal of ground, but I know that I have read the patents over, and paid no further attention to them, because they would be passed up to our attorneys for their opinion. Mr. Horan here would be the one man who would study the patents.

(Testimony of T. B. Sumner.)

Q. Do you take the "Timberman"? Are you a subscriber to the "Timberman"?

A. Oh, yes. We have been a subscriber to that periodical quite a number of years, I imagine.

Q. As far back as 1912, if the paper was published in 1912?

A. Well, I presume that we have subscribed for it. We always considered George Cornwall on our list of friends, and I presume we would patronize him by taking his magazine.

Q. I show you here an illustration which was published in the "Timberman" of Portland, Oregon, in the issue of March, 1912, the illustration being identified by the heading "Cleveland's Improved Simonson Log Turner." Had you seen that before?

A. I don't know, I have no recollection whether I have ever seen it, or whether I have not. Have no recollection of it whatever.

Mr. GEISLER.—I would like to prove the publication of this. I can call the printer. Perhaps you have no objection to the introduction in evidence.

Mr. ATKINS.—No objection.

A. It couldn't have attracted very much attention in this country, because I never have heard of one being sold by Murray or Giddings & Lewis, outside of that mill of Brace & Hergerts, so it couldn't attract very wide attention; didn't catch the eye of the millmen, at least.

(Testimony of T. B. Sumner.)

Page offered in evidence and marked Plaintiff's Exhibit 16.

Q. Did you carry an advertisement in the same journal, the "Timberman," of Portland, Oregon, in August, 1921?

A. Why I presume that we carried an advertisement, that is all left to the advertising department, something I don't give any attention to particularly.

Q. I am asking about the picture here, particularly the illustration, the whole thing. Is not that your advertisement?

A. Yes, that brings out the skid lift invented and brought out for, to show the superior skid lift that we built, which Allis finally stole, and other manufacturers.

Mr. GEISLER.—I offer this in evidence. It shows the Cleveland patent embodied in the device which they at that time advertised.

Marked Plaintiff's Exhibit 17.

A. Just a minute. The Allis and other manufacturing companies bought this skid lift from us to attach to their other turners which they were building.

Q. I show you a page taken from the "West Coast Lumberman," a periodical which I understand is published at Seattle, Washington. Do you know such a periodical?

A. Yes, we class that as among our friends. I presume we carry an advertisement at all times. This is our advertisement in the periodical issued by

(Testimony of Edwin E. Thomas.)
the "West Coast Lumberman," September, 1921. It brings out the skid lift. If you notice, the printed matter all refers to the skid lift, which we claim one of our superior machines.

Marked Plaintiff's Exhibit 18.

TESTIMONY OF EDWIN E. THOMAS, FOR DEFENDANT.

EDWIN E. THOMAS, a witness called by the defendant, being first duly sworn testified on

Direct Examination.

Please state your name, age, residence and occupation.

My age is 68. Residence, Portland; occupation, designer and builder of machinery. I have had rather a wide practical experience in designing and building machinery, several full lines of sawmill machinery, practically full lines for about thirty-five years. I am familiar with the designing and building of log handling machinery, including log turners. During the time mentioned I built several different machines. To quite an extent I am familiar with patents, and construing the same. I have taken out over fifty patents myself. I am acquainted with the type of log turner known as the Simonson log turner by observation, to quite an extent. I have read the five patents, which have been introduced in evidence and are marked respectively Defendant's Exhibits 6, 7, 8, 9, and 10. I have seen them all, read them. That is, read the notices of

(Testimony of Edwin E. Thomas.)

them that appeared in the "Gazette" at the time they were issued; as I look at them now, they are familiar to me, and I have had occasion to refer to some of them since. They are the patents taken out by Flavel Simonson on his so-called Simonson log turner. They constitute the development of the Simonson turner as far as he developed it. Referring separately to Defendant's Exhibit 9, figure 1 of the drawings of that patent, the member E indicates apparently the push-arm which is attached to the shaft.

Q. Describe the push-arm as you find it there.

A. It is an arm that is attached to the shaft.

COURT.—One or two pieces.

A. One piece. It is cast in one piece; here coming around, having two hubs, and joins to the shaft—no, there is no bearing between that. It is arm attached to the shaft in about the usual manner that the Simonson arm is now made, apparently, as shown there. It is evidently a bifurcated arm. It is so shown in Figure 2 of the drawing in that patent.

COURT.—What is this?

A. That is a hook that is shown in the other view; it is this hook here folded back between the arms. When it is in the lowered position this hook lay between the arms, as shown in this view.

COURT.—What does "e" represent?

A. I am trying to find out by looking at the other views.

Mr. GEISLER.—Pardon me for interrupting,

(Testimony of Edwin E. Thomas.)

but I have had a draftsman make a large drawing of that arm e, and if it will facilitate the examination, it is an exact copy of it.

COURT.—Does that represent this arm in one piece or in two, two arms? It looks as if it might be one on each side.

Mr. GEISLER.—Two arms.

Mr. ATKINS.—My claim is stated by reference to that patent that it consists of two arms "e," with spacing block bolted to them; the question whether cast in one piece, or whether made integral by bolted construction, or otherwise, we rely upon that as a bifurcated form.

COURT.—You concede there were two arms attached.

A. By a spacing block to which the arms are bolted.

COURT.—I understand the witness to say cast in one piece.

A. That is the reason I was in doubt. Pretty hard to say just how made by the patent drawing. They are made that way now, and I presume are intended to be shown that way in the drawing. This drawing purporting to be of the arm E, shown in the Simonson patent, Defendant's Exhibit 9, is apparently a correct representation of the arm E of the patent. (Referring to enlarged drawings furnished by plaintiff.) I find a showing of an arm bolted together, which is in effect just the same as if it were cast together, for all intents and purposes, to use. It is one, in fact these three parts

(Testimony of Edwin E. Thomas.)

are one for use. It is a bifurcated form, and it carries in operative relation the shaft C shown in this drawing.

The drawing marked Defendant's Exhibit 29.

COURT.—When was the patent Exhibit 9, issued?

Mr. GEISLER.—The date of that patent is March 17, 1891, and it is numbered 448,592.

Q. Again referring to Defendant's Exhibit 9, please state how the cylinder I′ and the rod K′ are shown as connected with the arm E″.

A. Well, the cylinder being pivoted at the point shown is connected to this arm by the piston rod and the arms of course are attached to the shaft as shown.

Q. Are they mounted on the bed-plate?

A. No, they are not mounted, only on the stand here. No bed-plate at all. Just a stand there. I would call that a stand or bracket.

Q. I am talking about these parts. Are they mounted on bed-plate or not?

A. They are mounted on the floor here; you can call that a bed-plate if you want to.

Q. Would the floor be in effect a bed-plate there?

A. In effect, yes. If it were strong enough to take care of them it would be a bed-plate.

COURT.—What is the purpose of the bed-plate in this patent? A. To hold the parts together.

COURT.—That is all the purpose?

A. That is all; to carry them, to hold them together.

(Testimony of Edwin E. Thomas.)

COURT.—It performs no function in the operation of the machinery?

A. No. It may be designed different ways and will work just as well if properly designed.

Q. The floor marked A in Exhibit 9, is this in your opinion the same as a bed-plate?

A. Why that is the only bed-plate that is shown here, the bracket which carries the shaft directly rests upon the floor, apparently, and that would leave the floor as the only bed-plate shown.

Q. State whether in your opinion that floor A is the full equivalent of a bed-plate.

A. No, I don't think it would be the full equivalent of a bed-plate now in use. Because it would lack the necessary strength. If made of wood, for one thing, it wouldn't have the requisite strength to carry the machine. If the floor were made strong enough it would be equivalent to a bed-plate, if the floor were made of iron, for instance, it would be all right.

Q. I now show you a copy of the Cleveland patent in suit, and ask you to state if you are acquainted with the same?

A. Why, I am only acquainted with it by reading it, that is all.

Q. You are acquainted with Claim 12 of this patent?

A. I have read it. I understand what is meant by the claim, from reading it. This Exhibit 26 represents the subject matter defined by Claim 12 of the Cleveland patent.

(Testimony of Edwin E. Thomas.)

Q. Please compare Defendant's Exhibit 26 with Defendant's Exhibit 27, and state in what particular, or particulars, they differ one from the other.

A. Why the Cleveland model has an arm on both sides of the main bearing on the bed-plate, whereas the other one has an arm between the two bearings on the bed-plate. That is the main difference. Either is capable of doing the work, just as well as the other, if properly designed and proportioned. The difference that distinguishes them is the arm being bifurcated and attached to shaft on both sides of the bearing on the bed-plate, and this one having a bearing on the bed-plate on each side of a single arm—having a bearing on each side of the arm. Exhibit 27 shows a bifurcated bed-plate with a single arm connected to a shaft between the bearings, and Exhibit 26 shows a single bearing and the bifurcation of the arm straddling that bearing. I would prefer this structure if properly designed and had a bearing on the shaft and a bearing on each side arm—two bearings on the bed-plate instead of one bearing on the bed-plate. I prefer the type of this Exhibit 27, of construction, rather than that, for my part. When I say I prefer, I mean I think Exhibit 27 shows much stronger construction if properly designed.

Q. I now show you this Exhibit 28, and ask you to state if you know what that represents?

A. I should say that represents the arm on Exhibit 27, with a boss extending on each side, making a long hub to extend between the two bearings on

(Testimony of Edwin E. Thomas.)

the shaft—on the bed-plate. If this arm, Defendant's Exhibit 28, were introduced into Defendant's Exhibit 27, in place of the arm there shown, the structure would be stronger, because the shaft has two bearings on each side of this arm, and it has a hub which would be approximately as long as this would be, outside of the one on Exhibit 26.

Q. Comparing the arm, Defendant's Exhibit 28, with the arm shown in Defendant's Exhibit 26, what would you say as to the comparative strength of the two arms?

A. Why I should say there was not very much to choose with the arm alone, but when it is assembled into the machine with long enough hub to give it the same strength that the arm has on Exhibit 26, and that hub having a bearing on each side—having two bearings on the plate, one each side of the longer hub, I should say this construction was stronger. I think the whole structure in this Defendant's Exhibit 28 would be stronger than the arm shown in Defendant's Exhibit 26, if combined in such a structure as shown in Defendant's Exhibit 27.

Cross-examination.

Mr. Thomas, did you ever design a log turner?

A. Several different types of log turners.

COURT.—How long ago was the first one?

A. The first one in '93.

Q. 1893?

A. But not the Simonson type. You speak of log turner. I built one for Garland Company in

(Testimony of Edwin E. Thomas.)

Bay City, Michigan, in 1893 or 1894. That did not have a hook-arm, it was not the Simonson type. None but the Simonson type have hook-arms.

Q. Did you ever build a log turner of the Simonson type?

A. No, I never did,—yes, I may say I did, too; one running in the mill of the Spaulding Logging Company at Newberg, which has a hook-arm, but doesn't have a regular push-arm. You asked that question, if I built one with hook-arm? That has been running for fifteen or sixteen years. About fifteen years ago that was built. Not inside of sixteen years. It didn't have a push-arm; and was different construction from the Simonson. I have never built a log turner which embodies all the features of the so-called Simonson type. My opinion as to the relative strength of the arms is based on quite a wide practical experience in designing machines for similar work. I never designed a machine of that type which was put to actual test with regard to endurance. I never designed nor built a Simonson type machine at all.

Defendant rests.

TESTIMONY OF JOHN F. MARLER, FOR PLAINTIFF (IN REBUTTAL).

JOHN F. MARLER, a witness called by the plaintiff in rebuttal, being duly sworn testified on

Direct Examination.

My age is 34. I am a lumber sawyer, head

(Testimony of John F. Marler.)

sawyer. At the Jones sawmill, Jones Lumber Company. When I was only a lad of a boy, I began working in smaller mills in the east, of only capacity of seven to ten thousand feet a day; from that I took up larger mills and drifted into the southern states; I spent a couple of winters in the southern states in larger mills, in the pine-mills, Then I came back to my home in southeastern Missouri, and stayed a year. Then I started west to the Pacific Coast. In 1910 I began working on the carriage around Grays Harbor, and from carriage work I built myself into sawing. In carriage work there are three jobs. Two are known as doggers, and the other one is known as setter. According to the rules and regulations of sawmill work, a man begins on the tail end of the carriage, dogging, and from there as there is openings he is promoted to the head end as dogger. He usually gets two bits or four bits more per day on the head end than he did on the tail end. While he is there he has a chance to learn to set, at spare times, and if he is successful at the time when a setting job is open, he gets it; that generally pays four bits to a dollar more each day, than dogging at the head end. And then if he is successful as a setter, commonly known as ratchet setter, the sawyer gives him a chance to saw occasionally; and if he is successful at that, why at the time a sawing job is open, or possibly sometimes the sawyers will know a place where they want a sawyer. On the carriage you have constant observation of the

(Testimony of John F. Marler.)

operation of the log turner, seeing it operate almost every minute of the day. In my present capacity as head sawyer, I have charge of the operation of a log turner.

Q. Now, will you explain to the Court, please, assuming that is a model which represents the patent here in suit; that the Judge is standing in front of a log turner; explain your position and the location of the band-saw, and just how you operate in practice.

A. The kind of a log turner I use in the Jones mill is built by the Allis-Chalmers people, it is similar to this model. The hook-arm is the same as this hook-arm but the main push-arm is a little bit different from that.

Witness is shown a photograph and asked whether the push-arm is constructed as shown in this photograph.

A. This shows identical main push-arm that I am handling.

Offered in evidence and marked Plaintiff's Exhibit 19.

The push-arm in the photo is identified by the capital letter A. In the model the push-arm is identified by the number 39. When you come back to the deck from a turn of log, you take the lever operating the Simonson turner, or log turner. The lever is known as four way lever; there are four motions to this lever, each way representing the way it is operated; one way turns the steam into the forward head or hook cylinder 40. The hook-

(Testimony of John F. Marler.)

arm is 41, and the hook is 42. This raises the hook 42. You then turn the steam into the foreward head of cylinder 38 connected with the main push-arm 39 (or 43), which goes forward after the log. When you are over the log with the hook, you then throw the steam in the rear end of cylinder 40, which drops the pick or hook, catching the log. You then go back with both push-arm and hook-arm, and the log is turned; you then retire cylinder number 40 by putting steam into the forward head; you then put steam into the after head of cylinder number 38, crowding the arm forward, pushing the log back on the carriage. You then retire cylinder 38 and go forward with your carriage into the saw.

Q. Are those motions you describe of the hook-arm always completed before you move the carriage? A. No.

Q. What is the practice with regard to keeping the carriage at rest while operating the push-arm or the hook-arm?

A. As a rule I reach for the log before I stop the carriage; when the carriage is about six feet from the stopping point I start after the log. By the time the carriage is stopped—in medium size or smaller logs—I aim to hit the log with the pick of the hook-arm by the time the carriage stops. Very often I take the log off the carriage before it stops. Up at the mill where I am sawing, this Allis-Chalmers turner has a flexible hook, which instead of being fastened with three bolts

(Testimony of John F. Marler.)

horizontally like some of them, it has one bolt direct down through, which gives fourteen inches each way, making a total of twenty-eight inches bend sideways. Thus, if you hit the log with this hook before you stop, it doesn't crystallize the bolts or bend the hook, it just merely bends sideways, and you take the log off the carriage and it does no damage. The bumping of the arms by the log while the carriage is in motion, and the push-arms or hook-arms are then thrown forward, is likely to occur at any time.

Q. Tell us what would cause it, with regard to the formation.

A. There are, of course, a good many logs that have knots on them, some of them I call knots and some of them I calls burls, limbs cut off and left long, I call that a knot, and if a swell or what is known as a burl, I call that a burl. In a good many cases in turning down a large log on the log turner, of course when that log comes down it comes down with its full weight, and especially until you get all four slabs off there is a time when there is a knot or burl on the top of the log, possibly it will be behind your hook-arm, and you start forward, unless you get the log turner completely down, this is likely to hit either the hook-arm or the push-arm, and give it side play, or possibly as the log falls and you crowd it back, maybe it will merely hit the arms or the arms will crowd in shear form, which would have a tendency to crowd the arms sideways on

(Testimony of John F. Marler.)

the shaft, or possibly strain the arm in some way. In order to resist such side thrust, it is necessary to make the hook-arm and the push-arm as strong as possible. My position is also looked upon as head rig in the mill. The head rig controls the output of the mill.

Q. What is your object in moving the log towards the log turner, moving the carriage that carries the log towards the log turner, before the log turner—the mechanism of the log turner—has stopped? Or, in other words, what is your object in moving one part of the device before the other is stopped?

A. To make all the time possible, as time is very precious at the head rig. The entire payroll depends upon the head sawyer of the concern. This in some places runs fifty-six cents a minute, possibly, other places maybe it runs as high as a dollar a half a minute, and all the time the head sawyer can save for his company means that much. And if you waited so that each device would be absolutely at rest before you moved the other device, you would be slowing down, you are lessening your output. If I were installing a mill, and had my choice of the structure shown in this Exhibit "A" of the interrogatories, and a structure as is shown in the model of the Cleveland patent, I would choose the Cleveland patent on account of the forked arm, with respect to the strength of the arm. In my experience along other turners of other constructions, I have seen an arm laying beside the blacksmith-shop at the

(Testimony of John F. Marler.)

St. Helens Lumber Company at St. Helens, and strapped back together with bars of iron and rivets, and this was back in 1916. I don't know just when broken, but I seen it there at that time. I have never seen any bed-plates broken, but I have seen them riveted together where they have been broken, and riveted back with bars of iron and rivets. With the heavy work that we have here on the Pacific Coast, it would not be practical to mount log turning devices just on the floor.

Cross-examination.

It would not be practical to mount a log turner directly on the floor because the floor is not strong enough to stand up for the work. The bed-plate lends requisite strength to the flooring. The bed-plate is anchored to the timbers, you see, of the floor, and you have both the strength of the plate and the floor too.

Q. Then it is just the strength of the floor that the bed-plate amounts to, as far as strength is concerned?

A. It makes more strength between the trunnions —commonly known as the trunnions of the cylinder and its bearing on the shaft; it increases the strength between these two points.

Q. In fact, is a metal strap that unites the parts of the plate together, is it not?

A. It is what?

Q. A metal strap.

A. No, it is not a metal strap; it is a casting.

Q. Maybe you draw a distinction between strap

(Testimony of John F. Marler.)

and casting. I mean a metal connection that unites the parts of the plate?

A. Yes. This machine shown in Plaintiff's Exhibit 19 was installed during the month of May and possibly a few days in the month of June of this year (1923) by the Jones Lumber Company. I have operated other log turners than the one shown here. I operated an Allis-Chalmers turner, one of the models, for the Beaver Lumber Company, at Prescott, Oregon; also operated an Allis-Chalmers turner for the Douty Lumber Company at Douty, Oregon. And I operated an old type of turner, I believe Allis-Chalmers, for the Bay Park Lumber Company at North Bend, Oregon. I learned to handle a log turner at Hoquiam Lumber & Shingle Company in Hoquiam, Washington. That is all. I was learning to handle a log turner during the years 1911 and 1912. I set ratchets on the carriage at Carlyle where they had a Sumner turner, and I handled it a slight bit occasionally—I don't know whether necessary to put that down. I was at the Bay Park Lumber Company in 1919 and at the Douty Lumber Co. in 1920 and 1921, at the Beaver Lumber Company in Prescott in 1922 and 1923. I began with the Jones Lumber Company when they installed the new turner. I began the 28th day of May. I worked a week before they put the turner in operation; they were putting it in at that time, and operating the mill at the same time.

Q. Will you compare photograph, Plaintiff's Ex-

(Testimony of John F. Marler.)
hibit 19, and Plaintiff's Exhibit 10, and state whether the arm "A" shown in the former is stronger than the arm shown in the model.

A. This arm and this one? Now, I really can't say this arm is stronger than this one, but the advantage it has over this one is you have room—you have a longer fork and you have room for the Hill Nigger; if you should ever want to install it you have room in the fork of the arm to install it, whereas in this one with shorter fork and center bearing, instead of two side bearings you have no room there for the Hill Nigger to operate in the fork. You see the main shaft is in two here; each fork of the main arm connects with the main shaft, leaving the yoke and main arm for the Hill Nigger also to operate up through the main fork.

Q. Referring again to Plaintiff's Exhibit 19, please state whether the connection between the arm "A" and the shaft upon which it is mounted is by aid of a single bearing or by aid of two bearings or connections?

A. Well, it is one bearing on each end of the shaft. You see the shaft is in two there; the shaft doesn't extend through there; the shaft is in two and it is all one bearing on each shaft; on opposite sides of the arm "A." The bearing is between the two arms here; the bearings of the shaft or bed-plate you see is between the fork of the arms in this arm. This arm is made in the letter A shape. This particular arm in Exhibit 19

(Testimony of John F. Marler.)

doesn't have what I would call a bearing on the shaft; it is anchored to the shaft; it operates the shaft, turns it. It is stationary on the shaft; it turns the shaft. This bearing 8 shown in exhibit model present in Plaintiff's Exhibit 19 is shown in the forked bearing in arm "A"—also a forked arm. The two bearings are between the forks of the arm. You have two bearings instead of one in the machine shown in Exhibit 19. These bearings are connected with the bed-plate. The advantage of the two bearings shown in Exhibit 19 for the arm "A" in that exhibit as a substitute for the single bearing 8, shown on plaintiff's exhibit model is that in the double bearing, or two bearings you have room to put in a Hill Nigger. A good many mills around over the country have both niggers—a turner and a nigger; they could put it in without yoking shaft around what they call the Hill Nigger. A Hill Nigger is a bar with teeth on it from two upright cylinders from below, these teeth pointing upwards; it turns the logs to the carriage and then pushes them back on. The Hill Nigger is used as a substitute for a hook, to make a reverse turn; where you want to turn the log to the carriage you can do that, or you can use the hook to turn it from the carriage. They are never used at the same time; that is impossible; they are used in lots of mills where they have both turner and nigger. It is quite an advantage in getting the material out of the logs. The purpose of the use of a hook and a nigger is to afford more complete

(Testimony of John F. Marler.)

control of the log in turning. Referring to Defendant's Exhibit 27, I don't remember of ever seeing one of that type. I understand this construction. This is the fork with two bearings on the bed-plate instead of having one single bearing; and it has a single arm; the arm is in a fork you see. The single arm is located between the bearings. With regard to the employment of single bearing 8, shown in plaintiff's exhibit model, with a bifurcated arm 39, straddling that bearing instead of the construction shown in Defendant's Exhibit 27, I would prefer the forked arm; I would prefer the forked bearing also. If the bearing were not forked, I would prefer the forked arm and the single bearing, because your shaft has a number of bearings along on it which support the shaft, and this is the only bearing your main arm has, and it is better for it to have two bearings than to only have one, in my estimation.

Q. Why better?

A. Supposing you were standing with your feet together like that, and would stand perfectly stationary, just like a statue, would be easier to push you over standing in that position than it would if standing in this position.

Q. In other words, you think the length of the bearing is an important feature?

A. In case you should ever strike it—

Q. Just answer the question, please. The length of the bearing is an important feature then as I understand? A. The forked bearing—

(Testimony of John F. Marler.)

Q. No, the length; the distance which the connection between the arm extends around the shaft is an important feature? A. Yes.

Q. Suppose you had an arm with a boss on it which gave an elongated bearing, as long for instance as arm 39 is, would there be any advantage in the forked arm over arm with boss as shown in Defendant's Exhibit 28?

A. I really don't know that there would, but you would never have room to put a Hill Nigger in there in case you wanted to; you only have a single arm, and if you decided to put in a Hill Nigger, would have to cut the shaft in two and have a yoke; cut and yoke around the Hill Nigger, which would weaken the bearing, and with shaft bearing you have room.

Q. But considering this construction shown in plaintiff's exhibit model you think there is no advantage in it over Defendant's Exhibit 28 which I show you?

A. Yes, I think it has an advantage over this. You have bearing in the middle, and the bearing or anchor of your forked arm on each side of the bearing, which supports it from side play, should you ever strike with that carriage—should something go wrong with your valve and the turner come up and go back and strike the arm; if supported on each side of the bearing it makes it stronger than if it is all alone. Now this happened to me once up at Douty; the nigger was up; I suppose that I possibly run against the nigger lever;

(Testimony of John F. Marler.)

I went inside to take something out of the guide, take a sliver out of the guide and was going back, and had emptied the carriage, and I started back, and the carriage struck the main arm, which was not a forked arm, not like Exhibit 19, but like defendant's exhibit. It was a crooked bed-plate with but a single arm; and I struck the arm. I knocked the shaft, the Simonsen shaft in end, which put the arm out of line with the cylinder. Then I couldn't get the turner down until we spaced the arm forward on the shaft to make up. By the crooked bed-plate I mean the bed-plate shown in the sketch on page 9 of the deposition of Charles E. Cleveland. That bed-plate shows a single bearing for the shaft to one side of the arm. If there had been two bearings as shown in defendant's model exhibit 27 instead of one bearing shown in the crooked bed-plate, possibly the accident would not have occurred.

Redirect Examination.

The push-arm and the hook-arm that I am operating at Jones Mill are standing up excellently; they have never given any trouble at all.

(Photograph showing the construction of a bed-plate in a structure such as shown in Plaintiff's Exhibit 19, offered, marked Plaintiff's Exhibit 20.)

The bed-plate shown in this photograph, Plaintiffs' Exhibit 20 is the same bed-plate as at A of Exhibit 19, on which the push-arm is mounted. The part marked B is really one casting but it is in two sections cast together. Bifurcated casting—

(Testimony of John F. Marler.)

forked casting. This bearing E has two bearings at the front; the casting is forked, and has a bearing on each end of the fork for the mainshaft; the push-arm A is connected on each side of these bearings, permitting room for the Hill Nigger to operate through the main arm A, should they ever want to install it. The construction of that bearing E in Plaintiff's Exhibit 20 could be effected in the bearing 8 of the model of plaintiff's machine, by cutting out a portion in the middle bearing so as to provide a space there, and if you would widen out the fork of the arm as it is shown in A it would be an advantage in my estimation, but to just take that much bearing out would be a disadvantage. By widening out the arms then you could cut out the middle portion. Giving as much bearing, but giving it in two places instead of one, which would be a help to the bearing, and it would also give room for a Hill Nigger to operate through the fork of the main arm. Now in that case where the Hill Nigger is used, the main arm, the push-arm is usually in the middle of the shaft, which would give the Hill Nigger practically the balance of the log which it has to have to do good work; we will say if this is the cylinder and the main arm is over here, and this helper was over there, then the shaft would be in two parts; the arm would be here and the shaft would be in two parts; the main arm would anchor to fit end of the shaft which would leave space for the Hill Nigger to operate and oscillate for turning the log

(Testimony of John F. Marler.)

to the carriage, in case they want it turned that way.

Recross-examination.

The Hill Niggers I have used are standing up fairly well. I am not using Hill Niggers at the present time, but I have used them; the turner that I am using now, as for the arms, they are standing up nicely. This bearing E in Plaintiff's Exhibit 20 is a double bearing, not a single bearing in the frame A, but it is a single bearing in the hook-arm, 41.

TESTIMONY OF P. R. HINES, FOR PLAINTIFF (RECALLED IN REBUTTAL).

P. R. HINES, recalled by the plaintiff in rebuttal, having been previously sworn, testified on direct examination.

Q. You may state what experience you have had in designing or checking over log turners to be installed in mills.

A. I have been investigating for the last two years the log turners of the Gedding & Lewis Manufacturing Company, for the redesigning of their machines, for which we purchased the patterns some time ago. I haven't only paid attention to the parts in the case, but I have also been looking into a number of other features, which have no relation to these patents; particularly my attention has been called to certain other matters which may or may not be patented later, but on the whole we have been investigating the machine from every possible

(Testimony of P. R. Hines.)

angle. We have not only examined our own, but we have examined others and have watched the action of the machine, and have been looking into one or two things very very closely over a period of two years. The function of a bed-plate is to make the machine self-contained, to give it a broad, firm base; if you get any settling or misalignment of parts you are very liable to get a very serious strain in the machine, so you put in a heavy bed-plate, to make the work all together, so it will be held in the position you want it to be held; a slight misalignment will make sometimes a very serious strain in the machine and cause breakage, so you want this bed-plate just as heavy as possible, and also naturally to hold the machine together. In a log-turner, naturally with high pressure of steam on, pushing out against a log there is a heavy strain thrown on the main bed-plate. Now, it is a well-known fact that in the old art the crooked bed-plates broke quite frequently under this strain. The difference in using a bed-plate for mounting the devices of a log turner, and using no bed-plate and having the mill mount the parts themselves, is if you design a steel bed-plate to contain the machine you know more or less the stresses and can design it fairly well, and you know fairly well what your steel will stand, especially in the tension; if you should put a timber bed-plate under that—steel does not warp or twist; it also does not change its dimensions under conditions of moisture —if you had put that on a heavy timber founda-

(Testimony of P. R. Hines.)

tion, that is a bed-plate alone and depend upon the timber alone, naturally the timber changes with moisture; the alignment of the machine changed, and timber is not generally considered a good material in tension; that is in flexure, or perhaps in compression timber is satisfactory, but even in constructing wood trusses we use steel rods for tension members; we don't use wood rods as a rule. Timber has high tension strength but you are uncertain in employing it, it would develop that full strength, so naturally we make heavy steel bed-plates. With respect to having an arm made forked at that part which is attached to the shaft compared with an arm which is simply straight, I will say very definitely on both that you have a side thrust prevalent in the machine, and naturally in designing the machine we have two stresses to take care of; we have the stress caused by the weight of the log in the direction that the cylinder lies, and also have the side thrust which we must take care of. In other words, in designing we must design that arm for two stresses; now it is not an opinion, it is a fact that in designing it for side thrust, in designing any member, if you can get the metal away from the center of the axis, which is neutral, you can get more strength for the same weight of metal, and that we are taught and it has been demonstrated in actual design practice, by means of experimental work, and also by mathematical demonstration. Now it is possible to design an arm with a broad base and with broad hub, and it

(Testimony of P. R. Hines.)

would be equally as strong, and that anyone would concede, who has a thorough understanding of mechanics, but it can be I am certain, demonstrated that the arm would weigh more. Now, we have to, in designing commercial machines, keep upmost at all times not only strength but price, because we have to sell this product, and castings are paid for according to weight, that is hundred-pound castings are generally quoted at a certain price, two hundred pound castings at a certain price, and when you get up to about a thousand pounds the price becomes more or less—that is we don't *just* from a thousand to eleven hundred pounds; we jump from probably a thousand to three thousand, the way the average steel foundry would quote, therefore any pounds of steel we can save and still get the requisite strength enables us to make competitive price, whereby we can go on the market and get business. Competition is this particular class of work is extremely close; a matter of a hundred dollars one way or the other would probably frequently decide the buy. The bed-plate shown as Defendant's Exhibit 27 can be constructed to do just exactly what the bed-plate shown in the Cleveland model does, but in doing it, in the first place, when you shove the arms up against the log you have a stress in the bed-plate, you would have a compression lengthwise of the bed-plate. Now in general, in designing structures or machines, if we can take an A-frame to stand a compression we would naturally do it; we certainly

(Testimony of P. R. Hines.)

would not take a V-frame. If we are going to pick up a heavy object with block and tackle, we use a shear which is an A-frame; we don't take a V-frame; if we do—we can do it—we have to make it extremely heavy. I concede that you can make this bed-plate equally as strong and equally effective, but you can't make in the same way, or as clean-cut and natural design as that one there. You are not only going to save in pattern and machine work, but you are also going to save on the erection of the machine, in the amount of timber you have to get in under the log-deck, and you also keep your space fairly clear for drop-down chutes going into the refuse conveyor. There would be a difference in regard to casting defects which might arise in a bed-plate such as illustrated in the Cleveland model, and the bed-plate such as illustrated in Defendant's Exhibit "A" of the interrogatories; that is the same as Exhibit 27. There is always conceded the possibility of casting defects in cast steel, and bed-plates are generally made of cast steel. Naturally the larger the casting and the more intricate the casting, and the more it departs from a simple structure in cast steel—I am not speaking of cast iron—the more possibility there is for warpage, and for casting strains of all kinds, and also blow-outs, but in general in casting steel you have to keep your lines as simple and the distribution of metal as simple as you can, because it is very difficult to case.

Q. State whether or not there would be any diff-

(Testimony of P. R. Hines.)

erence in cost in producing a bed-plate as shown in the Cleveland type from a bed-plate such as shown by Defendant's Exhibit 27.

A. Well, we have only one bearing on that, and in boring that the setting work required of mechanics, and line-up for the two bearings to be bored separately, even where they bore right straight through—I am doing estimating continually on parts and on all sorts of different work in connection with machinery, and I have accurate costs and am furnished accurate costs up to date constantly on all classes of work, and I can say without hesitation that double boring would cost more. I wouldn't say would cost twice as much but would say it would cost more. In the pattern work, patterns are expensive and naturally the more intricate the pattern, the harder it is for a pattern-maker to interpret the drawing; he takes more time in studying it; it takes more time for him to build it. In making a pattern of this kind he can make that pattern which is a little broader, he can make it almost in the same time that he would the two patterns; the only thing is, he uses a little more wood. The wood is not the expensive part of it. The more involved you get—it isn't a case of two half-bearings will cost the same as a bearing for patterns or models or anything of that kind; they always cost, thirty to forty, forty to fifty per cent more on account of the labor involved. Labor includes pattern work, drawing work and machine

(Testimony of P. R. Hines.)

show work, all of which are affected. The bearings require machine work.

Q. What would you consider, if you know, the approximate difference in cost in the construction of a bed-plate as shown by the Cleveland model, and the bed-plate as shown by Defendant's Exhibit 27?

A. Well, I have looked it over for several different reasons, and I would estimate that for a single bed-plate and a single bearing would cost you roughly about fifty dollars more to build. There would be two in each log turner. I have looked over the patents cited by defendant in this case.

Finding in the first place an example of the hook-arm: Patent, 408,760, issued to F. Simonson, August 13, 1889, shows a hook-arm actuated by a rope; Patent 448,558, March 17, 1891, to Flavel Simonson, shows a hook-arm actuated by a rope device, and a mechanically moved arm. On the same date to Flavel Simonson is No. 448,590, which shows an oscillating steam cylinder. Then there is 448,591 to F. Simonson, which shows the hook-socket actuated by the same mechanism which operates the arm; this is dated March 17, 1891. And then there is 448,592, to F. Simonson, March 17, 1891, which shows a hook, and the push-arm operated by an oscillating cylinder, and the hook-socket actuated by the same piston rod as actuates the hook-arm, but no bed-plate is shown, other than the floor. That is Exhibit 9. Exhibit 10 seems to be more specifically a method of steam

(Testimony of P. R. Hines.)

control to the cylinders, otherwise is very similar to Exhibit 9. We then come to 992,212, issued May 16, 1911, or ten years afterwards. This was issued to W. H. Kratsch, and assigned to the Challoner Company, who were the original manufacturers of the so-called crooked bed, Simonson type. This shows a very complete machine and shows the straight-arm and crooked bed type, which was employed before the straight line bed came into use.

Q. Will you please explain what in your opinion you consider the difference in result, as far as the mechanical operation is concerned between the crooked arm—bed-plate such as is shown in this Kratsch patent 992,212, and the straight bed of the Cleveland patent.

A. The machine as shown in Exhibit 20 was a successful machine, and embodies a great deal of the principles of to-day.

Q. You testified here with regard to the advantages obtained by the A-frame construction. I show you here a diagram and would ask you by means thereof to explain the advantages that you refer to. Let it be assumed that the member S is a shaft, and that on that shaft is mounted perpendicularly an A-frame composed of sides a′ and a2 and that a force is applied as indicated, and in the direction pointed by the arrow F. It is also assumed that the A-frame is tied to the shaft at points a3 and a4, that is, at the base of the triangle. Now, will you kindly explain from that?

A. Well, in an A-frame, a stress applied in the

(Testimony of P. R. Hines.)

direction F—direction of the arrow F. would cause a compression in member a′ and a tension in a2. The direction of the compression force and the tension force are indicated by letters on this sketch. The compression is c and the tension is t. Now, in a structure of this kind, it will be direct compression and direct tension. There will be little, if any, of what we call flexure. If it were a solid beam, you would get beam action and a flexure which is entirely different from the action of truss compression, and the stresses are much more equally distributed throughout the metal. In other words, in designing a structure of this kind, we take the direct areas as being in compression and tension, while in a solid arm of this kind, we would have to determine the flexure stresses which are zero at the center and become greatest at the outer margin. The result is, that all the metal is employed at its maximum strength, and for the same weight of metal, or for the same force "f" the weight of the metal would not be so great. In figuring strength, we figure for strength, but in figuring commercial machines we tend to keep the weight down as much as we can, especially out here on the coast, because we have to pay high freight, and there is no use making a machine any heavier than necessary. It only adds to the weight and the expense, both of manufacture and freight.

Q. State whether or not the design of the Cleveland arm has or has not any features of similarity to this A-frame structure.

(Testimony of P. R. Hines.)

A. The Cleveland arm, an analysis of it in my opinion shows that the arm is not only strong in the direction of throwing the log but is also strong laterally against every possible thrust which it might get through the log moving, the carriage moving, or being struck by carriage or any of those accidents that are liable to occur in handling a log quickly. In other words when you speak of strength of an arm or beam, you have to refer to what axis the strength is figured for. Very often, an arm might break on one axis, where might be amply strong on another axis for the work it is to do. This arm is strong in respect to both axis, either for weight of log on the arm, or for any side thrust which might come.

(Sketch offered in evidence marked Plaintiff's Exhibit 21.)

I was present in court and heard the explanation on behalf of the defendant with regard to the construction of T-arm and as also shown here on Defendant's Exhibit Model 28. Where a T-arm is used in a machine such as we are considering, and subject to side thrust would probably be nearer to the tip end of the arm, naturally for the hub is away below the carriage.

Q. Where are the breaking stresses?

A. Naturally the piston can hardly support this weight at all, so naturally the fracture would come near the hub. This frame can be made amply strong enough with certain disadvantages. The disadvantage would naturally be that it has to be made

(Testimony of P. R. Hines.)

a great deal heavier, and the reason for that is whether this is subject to flexure this way or that, the metal as far as working in the center does not work. Stresses are zero here and the stresses would increase proportionally from the distance it is from this neutral section; on one side would be compression, and on the other side would be tension.

Q. If you wanted to change that arm so as to do away with some of these disadvantages what suggestion would you make with respect to it?

A. We would probably make the section as near as we could to a T-section. The idea being to keep the metal thin at the neutral zone, or where it is not effective, and place it well out where the maximum effect would be obtained. We probably would make these ribs similar to fins or flange. The idea being to core out as much metal as you could at the non-effective part. We still have a great deal of weight in this arm as redesigned, on that sketch in your hand now.

(Sketch introduced and marked Plaintiff's Exhibit 22.)

I am inclined to think the steel foundryman would find some objection to this. In fact, I am sure here in town they would. We probably would try to get away from the large body of metal there is down in the lower part of the arm at the hub. Indicating in red pencil these changes, we probably would start to cut out that large amount of metal and place it still further out, as it is desirable, not only from a mechanical standpoint, but also from

(Testimony of P. R. Hines.)

a casting standpoint. I would say that the easy curves that are shown in Cleveland's design were drawn by a man who understood casting steel extremely well.

Q. What difficulties are apt to arise, if any, in casting a mass of steel to some particular shape?

A. Well, in casting steel we must not get a large accumulation of hot metal, as it is something that will cool suddenly at the other end of it so that as it cools off you will get what we call a casting strain. Now, it is highly desirable that this log turner work be done all in steel, and we go as far as we can in the stresses; then we go to a man who knows practically how to cast steel. The arch in the Cleveland arm appeals to me. You haven't great weight or volume of metal that takes a long time to cool, but you have a chance for a little expansion there that will not set up a big strain. I refer to the bifurcated portion of the Cleveland structure. There is something to give a little, and if it does give a little, they can correct in the machine-shop in the machine. You can get a cast strain in metal which is far more strain than any strain it is subjected to in operation. At the same time, we must be careful in getting distribution of metal properly on account of gas pockets; you must keep the metal all fluid so the gases will rise up through. If you get it cold on top, the gases will concentrate at one point and you will find when you put that in service that it is honeycombed, also known as spongy con-

(Testimony of P. R. Hines.)

dition. And this particular arm casts extremely well.

Q. Having reference to the two structures in the bed-plates, one of which is shown in Cleveland's patent, showing a bed-plate tapering towards the front, and there provided with a bearing for the shaft, which is straddled by the bifurcated portion of the arm, now compare that with a bed-plate which is spread at that portion in which the shaft is journaled, and has two boxes for the bearings of the shaft, spread a considerable distance apart; kindly explain the advantages or disadvantages which may arise in the two structures?

A. May I have those two models? (Takes Exhibits 26 and 27.) Well, this bed-plate here which is Exhibit 26 showing the Cleveland Patent, we have an A–frame bed-plate. Now, it is subject to both tension and compression in various stages of the work; it also has to furnish a solid bed and frame for the whole machine to operate from. As now built, and as it has been built, has been ample for the stresses. You will notice, however, that we have had to put several small tie rods, that is, they are cast integral, but to tie the frame together. Referring to portions designated in pencil, say C and D in Defendant's Exhibit 26,—if you subject that bed frame to compression there would be some tendency for the arms to spread apart at the trunnions. This is prevented by the two tie rods C and D and by the bolts in the bed-plate, but the structure acts all together, as all bed-plates do. It is very compact,

(Testimony of P. R. Hines.)

and for the same strength, a minimum amount of metal. Now, Defendant's Exhibit 27, I feel quite certain, can be made amply sufficient for the purposes it is intended, provided proper care is taken throughout, in fact, I see no reason why it could not be, but this frame, referring to the bed-plate, I think myself personally is a little out of proportion to the front end. I am absolutely certain that as broad a bed-plate would not be easy to case. Defendant's Exhibit 27 would require a larger flask and more careful pouring and gating. At the same time I am quite convinced that installation in the mill would cost more, as you would necessarily have to put two heavy stringers or three well spread out under this bed-plate. In actual operation these machines become covered with dirt and bark from the logs, and in modern installations it is very desirable to set these upon as few timbers as necessary, and of narrow width, so that the refuse may drop down through into a refuse conveyor down below, and I think the broader bed-plate does not give any more strength, at the same time takes considerable more room. These log turners are installed in a narrow, confined plate; it is necessary in the operation of the log turner that the log roll over the machine and onto the carriage, and when the log turner is not in actual use it occupies a very low place under the log deck, and the different parts are placed between the different skids of the log bed, and the area is very restricted for repairs and for ease of inspection, oiling, etc. There are from

(Testimony of P. R. Hines.)

three to eight or nine skids, over which the logs roll down, and generally one is placed between the push-arm and hook-arm cylinder so the logs may roll down on the carriage as needed. Taking into consideration the spacing of the journal boxes on the bed-plate, Defendant's Exhibit 27, there is one thing that I have not mentioned here. While not always necessary, it is always considered desirable to have the bed-plates alike. The reason for this is it only requires one pattern, one drawing, and consequently it is much easier to manufacture two things alike than two different. In this type of bed-plates (Exhibit 27) you must either bring out a long hub on the push-arm, or your hook and push-arm bed-plates will not be the same. The reason for that is that it is necessary to put a clutch on the hook-arm of some kind or other. The clutch is necessary to actuate the helper arms when you, as the sawyer says, go after the log, to raise the other arms jointly with it, at the same time it allows it to disconnect when you are through with it. Referring to Exhibit 29, being sketch supplied by plaintiff of arm "E" of the Simonsen patent 448,592, March 17, 1921, this arm is made double to provide a pocket for the hook F, but the push-arm shown in this patent 448,592 goes back again to a single arm with no bifurcation, lateral bracing or anything of that kind.

Q. Would you consider an arm constructed of two pieces bolted together over an intermediate piece as strong as an integral casting?

(Testimony of P. R. Hines.)

A. No, I would not. In the case of floor beams, which are subjected to more or less steady load, I think you can design a separating piece with a bolted connection that is entirely satisfactory, but I don't think myself that I would bolt two arms together that way, for the simple reason that to do a good job I would have to do an awful lot of machine work. I would have to bore for the holes; I would have to do a lot of facing on the finishing piece and facing on the arms, and I don't think it would pay to do all that work if I could possibly cast them together. There is no machine work whatever to be done afterwards on that particular separating piece, and as it is there naturally you would have to do a good deal to get a tight fit; you couldn't simply cast and put it in there.

Mr. ATKINS.—The perfectly obvious thing would be to cast that all in one piece, wouldn't it?

A. The obvious thing to do would be to cast it in one piece.

Having reference to that portion of this arm E in that Defendant's Exhibit 29, located directly next to the hub, or the shaft, I would not consider that construction as efficient as the Cleveland bifurcated arm, because the Cleveland arm straddles the bearing. There is a great deal of mutual support, and there is a great deal more strength in the Cleveland arm, for lateral strength, and I think lateral strength myself is important in this work, from my own observation. Considering now the Cleveland device as presented to us by Claim 12, the elements

(Testimony of P. R. Hines.)

by themselves to a large extent are old. The combination of them—it is very easy now to say well it is nicely combined and nicely gotten up. I don't know myself that if I were designing that, that I would arrive at it, but now that it is finished I can say, yes it is a nice combination of well-placed metal; it shows a clear understanding of the actual thrusts and strains that a log turner is subjected to, and I think there is no question about—well, in every way from a manufacturing standpoint and from a mechanical or engineering standpoint. If you take the whole thing as a whole, it certainly fills exactly what you wish to do with machine of this kind and at a minimum of weight and material. The elements making up the device all mutually support each other. The best way I can say is like a three-leg stool against a simple two-leg mechanism, which laterally is not stiff; this is supported in all directions. I have seen the Cleveland log turners, as manufactured by Geddings & Lewis, at the McCormick Lumber Company, McCormick, Washington; at the Standard Lumber & Box Company—I believe Buxton is their address; it is on the Tillamook line of the Southern Pacific; I have seen the Crossett Western Lumber Company at Wauna, Oregon; the National Lumber & Box Manufacturing Company of Hoquiam; and I have seen two installations at the Pacific Lumber Company, Scotia, California. I have studied all of them with a particular view of revising and improving our design wherever possible with reference more to the control of the

(Testimony of P. R. Hines.)

cylinders than any other feature. I found them operating satisfactorily in every respect except the cushion which has nothing to do with this patent.

Cross-examination.

I am thirty-six years old.

Q. Your testimony has been offered here as an expert witness. Will you please state what qualification you have to testify as an expert in this case?

A. I have been on test work and design since 1908. I have had a thorough training in engineering work. I worked under David Cole for two years, who is consulting engineer for about fifteen mining corporations. I was not only actively engaged on management, but did actual machine work besides. Fully 50% of the machinery that we installed was of our own design; we didn't buy standard manufacture. I was for two years chief engineer of the Caucasus Copper Company, Ltd., that had shops as large as Smith and Watson's Iron Works here in town. Due to high duties we built 75% of the machinery that we used actually on the ground in Russia. We built a great many things where here in the United States you would naturally purchase, things that the average designer is not called upon to design because you can go to some shop and buy them—they have built them that way for years. I was with the Allis-Chalmers Mfg. Co. several years, and while there was directly in charge of investigation work in the field, of the faults and troubles, and the redesigning of a machine that had just been on the market, embodying an entirely new

(Testimony of P. R. Hines.)

principle for a year and a half. I examined at that time over forty installations, went into their various troubles, and was active in the redesigning of the machine and the final perfection of it. I was also sales manager for the Dings Magnetic Separator Company of Milwaukee, whose work entirely started in a testing laboratory. We built some standard machines, but a great many of them were special, and a great deal of work was special development designed for special purposes, where perhaps only one machine would be installed, and no others would ever be sold again. I have built in Portland from my own design and under my own application for patent a 25,000 pound machine last year. The last two years I have been paying particular attention to the log turner, not only in view of this patent case, but also of more primary importance at that time was to perfect certain features which have given trouble not only in our log turners but everyone else's, and which still give trouble today and we are still investigating them. All of these matters have no reference to the present patent. I am a mining engineer.

Q. Not a mechanical engineer?

A. I got a degree as Engineer of Mines from Michigan College of Mines, Holton, Michigan, in 1907. I am not acquainted with the state of the art by practical knowledge of it at the time when Mr. Cleveland took his patent. My testimony in regard to the operation of these machines and the objections which I have mentioned is based on

(Testimony of P. R. Hines.)

examination of the machines themselves, examination of the operator, and actual observation of the machines themselves in actual service, and not only the observation of Mr. Cleveland's machine but there are a great many log turners installed on this river of the old type—Simonson crooked bed type. A new machine doesn't develop its weaknesses the first year. We find that it is only after years of service; the reason we pay particular attention to machines in operation is that, as the machines are operated over a period they commence to develop their weakness. The things we don't get in design; and the best way to get what we call the bugs out of a machine is to see the old machine; they have been through what we call the mill; they have been through this hard service of handling the logs. I would say that you have a better chance to-day to see the result of the different designs that you would have, say, twenty years ago, or ten years ago; weaknesses that are now apparent in the first three months even become more evident, and it is only by correcting these faults that we get a perfected machine.

Q. Have you observed personally any weaknesses in the Cleveland log turner? A. Yes.

Q. In respect to the combination defined in Claim 12 of his patent?

A. No, not in that respect; have seen weaknesses naturally, but not in that respect. I have seen—if you wish information—I have seen the arm broken, but the breakage in the way of the arms

(Testimony of P. R. Hines.)

has been entirely due to the hook-arm action, it has not been the push-arm. All of the breakages that I have seen.

Q. It is in the hook-arm?

A. It is in the hook-arm; yes.

Q. And you have only seen one breakage in that respect?

A. No, I have seen probably three or four.

I have not seen Defendant's Exhibit 27 in operation, nor have I any personal knowledge of it. I have not been able to compare these two machines in actual construction and operation. I have never been able to find one in this vicinity. When I testified in regard to the comparative merits, or demerits, it was in theory only. I am now in the employ of the plaintiff corporation. I have represented them out; I also have other business. I am their agent here. The Allis-Chalmers Company has no connection with the plaintiff corporation at the present time. They are exclusive licensees, however, under these patents. We reserve the right to manufacture for ourselves and for them only. That was arrived at two or three years ago; I am not prepared to state the exact date. They applied for license and we granted exclusive license to manufacture the Cleveland type of log turner, and since they have started to manufacture under this license they have sold some nine log turners in the last year and a half. They were builders of the crooked bed type. the old Calloner or Simonson type, and their business was going behind at that

(Testimony of P. R. Hines.)

time, but since changing over, they have sold a great many and they have paid their royalties up to date, despite any lawsuits on the Cleveland patents. The plaintiff corporation is not building any machines under the Cleveland patent now on account of competition, and on account of the defendant's superior freight advantages over us in the east. We have furnished one for abroad, but since acquiring the patent we have only manufactured one machine to my knowledge. We have bid, however, on at least six jobs out here in the last two years. Plaintiff's Exhibit 21 represents an A-frame, with what we term fixed supports, connected at the top. It is a diagrammatic sketch such as we use in the analysis of stresses, the same as you were instructed in under an art called graphical status. That Exhibit 21 shows the stresses of the shaft and the side arms by a1 and a2. This diagram is merely a picture of a triangle, it doesn't show depth or transverse strains. The strains referred to, are those which occur or might occur by a force applied in a direction parallel to the axis of the shaft S, and no other strain is considered on this particular stress sheet. We would term it a stress sheet. There are other strains that would come up a push-arm, for instance, besides those that are illustrated in this diagram. I have confined not my testimony to one class of strains, but that stress sheet, is used to illustrate the particular push-arm shown in Plaintiff's Exhibit 22 and in Defendant's Exhibit 28. There are other

(Testimony of P. R. Hines.)

stresses not taken into account in the stress sheet. I have suggested that the arm shown in Defendant's Exhibit 28 would be improved in strength by the addition of webs—ribs, indicated by red pencil lines in Plaintiff's Exhibit 22.

Q. Now, what would occasion you to suggest those changes?

A. Well, if you watched a sawyer log a log—I watched one the other day; he slabbed one side, and as he turned it, the log stood on just one edge. Now, you take and balance something on just one edge and say that log was a little tapering to boot, most logs are tapering—you get it up there; almost any movement you send it that way or that way; it isn't just at that particular moment and that particular position you are holding that; I can't hold it with the thin edge there. I want to get under it; it is not a round cylindrical thing or flat surface. The strain may be any way, and these logs weigh—and I think anybody will agree with me, they saw logs scaling ten thousand feet at a time, probably the average log scales five thousand feet and the weight of the green log is about six pounds per foot, board measure. In other words, we are dealing with a five thousand foot log weighing six pounds to the foot which would be thirty thousand pounds or fifteen tons; we often handle double that amount. Now, the question of side strains there is not only side strains but glancing strains of any kind, of a knot or burl, with fifteen tons which may be concentrated on this thing; we

(Testimony of P. R. Hines.)
naturally have to consider other stresses than the pure weight of the log on the arm.

Q. If I understand you correctly, if you discover in use the manifestation of a strain upon your mill, you would devise means of meeting that strain, would you not?

A. I would try to; I don't say I would do so; I would try to.

Q. But that would be the immediate suggestion overcoming that?

A. No, it wouldn't. It is very easy to sit here, and say, well, we would do so and so; after a thing is accomplished it is very easy to say what you would do, but before it is accomplished or before perfected it is very difficult to say what you would do.

Q. That is exactly what I am trying to get at. You have drawn a sketch in lead pencil on Plaintiff's Exhibit 22 sitting here at this table, and what I want to know is what that sketch suggested by the strains which you have observed in practice?

A. Yes, now that I have gone into it fully and examined it carefully and analyzed it, but on first thought, no.

Q. Well, if you had to meet a condition in which such strains were exerted, this Plaintiff's Exhibit 22 is substantially how you would meet it, is it not?

A. No; I had a similar case of cast steel, a matter of three or four years ago, it was before the war, and was not only my case, but there were three or four of us involved in it; we have a certain

(Testimony of P. R. Hines.)

stress, and we wanted to cast steel and we finally had to abandon it entirely; we couldn't cast it properly although we did this and we did that, and we couldn't get it. We finally had to make an enormously heavy section of cast iron to meet the condition. I can't tell you what I would do if I were back ten years ago or fifteen years ago—that I would do that; I don't know that I would. I am talking now in the light of the knowledge that has already been placed before us, but if you ask me—give me a new problem as to what I would do, I don't know what I would do. I have done so much designing and have had to revise my own designs after the machines have been in operation, and have seen things that I thought were absolutely correct in laying them out on the drawing board and then go out and see them fail, that I can't tell you what I would do if I had to design that arm at the start—was a brand new machine.

Q. Then you don't know that there is any relationship between the structure shown in Plaintiff's Exhibit 22, and the push-arm which Mr. Cleveland patented in 1909?

A. I can analyze the structure as it is to-day, or anybody else, and see that it is absolutely sound, but I can't testify to what went through Mr. Cleveland's mind, or anybody's mind. I can testify as to the logical and sound engineering principles and the beauty of the design as I have seen it to-day, and after I have seen a lot of log turners; I can

(Testimony of P. R. Hines.)

testify to that, but I can't testify to anything at the time of Mr. Cleveland's patent.

Q. Now these suggestions which you have made in red pencil on Plaintiff's Exhibit 22 are ordinary mechanical contrivances, are they not?

A. Well, they might be and they might not be; it is very hard to say. I can't testify as to what is mechanical and what is inspiration, etc. I am not in that position to be able to do it. In other words, the deed is done; I can't testify in regard to any of the things that preceded it.

Q. If you had a machine embodying Defendant's Exhibit 28 before you, would you not be able to arrive at improvements as you state, in the strength of the arm 28 along the line that you have indicated in Exhibit 22?

A. I don't want to make an impertinent answer, but I will say this: That I don't think I am any smarter than the men working on this at the time, and there was a very long period went by in which no one improved it, and I have no reason to believe that I would have any superior ability. It isn't any attempt to evade the question, it is just—for me to say here on the witness-stand, why yes, I could do it, I haven't that much egotism. I don't believe in my own knowledge of design so well as to say anything of that kind.

Q. You understand, don't you, that this Defendant's Exhibit 28 represents a straight arm provided with a boss on its shaft end, with which

(Testimony of P. R. Hines.)

Mr. Cleveland has testified he was acquainted before he made his invention? A. Yes, sir.

Q. Now do you think—is it your opinion that the arm, Defendant's Exhibit 28 is the substantial equivalent of the arm, the push-arm shown in the Cleveland patent?

A. No, I don't think it is substantially equivalent. I think that it can be made the equivalent by the expenditure of more money and more metal. That it is the equivalent, no it can't be.

Q. Then the only difference that you see between these two arms is one in respect to expense?

A. Not entirely in respect to expense; at the same time in this arm you must remember, this arm here, it isn't the single arm that we have to consider; it is the nice combination of design. Compactness, minimum cost of manufacture. I think that I very distinctly stated, was authorized to do so, that any manufacturer who wished to manufacture the split bed type with bifurcated arm, even straddling the bearing was welcome to do so, and we certainly would not waste our time in any patent litigation, and yet, despite the fact that we have substantially stated this we still want to manufacture in that way. Allis-Chalmers find they can pay us a very small royalty—it isn't very large royalty. They must find it desirable to pay us that extra amount; there is some question of money in selling machinery; there is always a question of money, but there is always a question of something that appeals, you can't say why; you

(Testimony of P. R. Hines.)

ask any mechanic, you can bring him down by cross-examination and analysis of it bit by bit and gradually bear him down, but he will come right back to it that he likes this; the ordinary sawyer will tell you that he likes it, and he may not have any mechanical training whatsoever, because he knows just from study himself that the thing is right, this combination. You take the arm alone it is—they are the same—you can make them the same, but you can't make them and fit them in; you can't take this arm and fit it into this mechanism.

Q. Can you point out any difference between this Exhibit 26 and Exhibit 27 other than mechanical variation? Is there any difference in principle in the operation of the two machines?

A. They operate substantially in the same way. You can take this machine, and if you are given a good designer, build a design of that and find out what is wrong and correct in here and there; yes, you can get a working machine; you can get a machine that will work and turn your logs.

Q. Now, I call your attention to the bed-plate shown in Defendant's Exhibit 26, and will ask you to state whether that does not show a bifurcated end, between which the cylinder which it carries is mounted in bearings—suppose that the opposite end of this bed-plate to which you have just referred were bifurcated, after the manner of the bed-plate shown in Defendant's Exhibit 27, it could

(Testimony of P. R. Hines.)

be made to operate to carry the push-arm shown in Exhibit 27, could it not? A. Yes.

Q. Then all that would be necessary to convert the bed-plate shown in Defendant's Exhibit 26 would be to bifurcate the end opposite the cylinder trunnions, would it not bifurcate it—in other words make this end like that, and put that arm in between there?

A. That is perfectly practical and I have seen photograph of machine so built.

Q. Please state the comparative costs as you estimate them between the bed-plate as shown in Defendant's Exhibit 26 bifurcated at both ends and the Cleveland machine.

A. That is taking Exhibit 26 and bifurcating?

Q. Yes, or with such changes as would naturally suggest themselves to an engineer.

A. Why I think that has been pretty well answered before; I could actually estimate it for you and arrive at it very closely, but I think offhand—I think about fifty dollars. Then you have a greater expense—that is it doesn't make any difference if these are only half bearings, it costs you more to build two bearings than it does one. There is a rule of estimating I know; I have done so much of that kind of work. Naturally if you come out here you have to put more metal in here to hold this; you have to make this very strong across there because that is the A-Frame, mutually self-sustaining. How much metal exactly I can't say but you are going to use considerable more metal; your pat-

(Testimony of P. R. Hines.)

tern charges would be a little more, and what is also very important, your millwright work and the erection work will be more undoubtedly; I don't think there is any question about that; also the bottom of these bed-plates are planed, they are machined in other words, and your model is not exactly correct; ours is correct over there; but you will find that on the planing work, you take a tool going over here, just over these little ribs, it takes just as long almost to go over that little rib as though you went down the full length; if you examine the photograph of that bed-plate there is cut out in ours. If I bifurcate the bed-plate, I got to go out here enough to grab the outside of this frame. The minute I get from the A-frame with two A members down there, I have to go in and I have to tie these together; I have got to tie them rigidly all the way along to make them work together; I would have more cost on that.

Q. You still adhere to the opinion that the double bearing bed-plate will make the machine cost fifty dollars more?

A. Yes, I am sure it would.

Q. You have used the terms "compression" and "tension" and "flexure"—please define these terms and explain what you mean by them.

A. When an arm comes up against a log when the log is going down on the arm, you may push it back and forth, this is in flexure; the two reactions here where there is weight on there will give compression in the piston rod, and naturally

(Testimony of P. R. Hines.)

you can see it will cause compression in the frame; as you push from here out, pushing a big log out you will get tension in the bed-plate, that is when you are pushing on the log. Now you can get any kind of a stress here at times; you may get twisting or torsion; you may get like this; may just get a twisting of the whole bed, which you might get in casting; might get any casting strain; might also get the deck of the mill settling; it is not very liable to settle in that direction, more liable to settle in this direction, but may get any, and may get a twisting; in that case you have torsion. When you speak of flexure it means tendency to bend by a log that opposes resistance to the onward movement of the arm. In the operation of the machine you always have a log as the ultimate object to be acted upon by the machine.

Q. I hand you a copy of the Cleveland patent in suit and ask you to state if you know the element which distinguishes the structure defined in that claim from that which was old in the art at the time the Cleveland made his application.

A. It isn't a case of elements; it is a case of combination of parts well fitted together, and I couldn't pick out one single element in there.

Q. I ask you, with a copy of the Cleveland patent in suit before you, to refer to Claim 12 and compare it with the answer to XQ.–23 made by Mr. Cleveland in his deposition on pages 16 and 17. The question reads as follows: "Did you prior to your invention of the subject matter of

(Testimony of P. R. Hines.)

the patent in suit ever see the combination of a bed-plate provided at its outer end with a shaft bearing; a shaft extending through said bearing; and an arm in operative relation with the shaft; a power cylinder pivotally mounted upon the bed-plate and a piston rod working in the cylinder and connected at its outer end to the adjacent end of the arm?" Mr. Cleveland's answer to that question was in the affirmative. I now ask you to state the difference in the combination defined in that question and the one defined in Claim 12 of the patent.

A. Yes, there is a difference. Well, I think it is merely a matter of reading that claim 12 because it is just a matter of whether certain words are present or not. I can carefully compare these and read that so it will be exactly accurate, but to save time I would say "said arm being bifurcated and straddling the bearing formed upon the outer end of the bed-plate," is in Claim 12 and not in this question 23. That is the only difference I discover.

Q. In Claim 12 do you find any reference to a straight bed-plate? A. No, sir.

Q. Then what you have testified to in regard to the difference between a straight bed-plate and some other bed-plate is a matter outside of the claim, is it not?

A. Well, that is a legal question; I don't know. In speaking of straight bed-plate I spoke as an

(Testimony of P. R. Hines.)

engineer; from a patent side, I am not a patent lawyer and I can't say.

Q. You undertook to explain the terms of this patent and others?

A. Never from a legal standpoint; I don't know anything about that. I am merely explaining it from the side of an engineer.

Q. When you have testified in regard to the meaning of these patents, you mean to say you didn't know what the patents meant?

A. Oh, yes, I can read them—read them clearly, and I have already testified that there is no word "straight" in there, and whether outside or inside, the question is not sufficiently clear as to whether you refer to a specific answer I have made there, why I don't know, or whether you refer to some past testimony. If you will make your question specific, I will answer it specifically.

Q. Claim 12 does not call for straight bed-plate?

A. No, sir, the word straight is not mentioned.

Q. I think you said you are a mining engineer and not a mechanical engineer?

A. No, sir, I did not say I was not a mechanical engineer. I have no mechanical engineer degree, but I have worked entirely on machine design, mechanical work. I have done very little work in mining for years, although a great deal of my mechanical work has been for mining companies.

Q. You have testified, Mr. Hines, that the only breakage you are acquainted with in machines of the Cleveland type was on the hook-arm?

(Testimony of P. R. Hines.)

A. Yes, sir.

Q. Not upon the push-arm? A. No, sir.

Q. Can you explain how the breakage would occur on the hook-arm and not on the push-arm?

A. Yes. Our socket at the top was very weak, and we got a great deal of pounding in the pins there, and we have broadened it out; it was apt to break where the socket was held there. On hook socket No. 49, I believe we have added some brackets up there. We have not added any brackets in either arm proper. The push-arm has been very satisfactory. We got some little pounding in the pins but we have removed that.

Q. Referring to the Cleveland patent again, arm 49, for instance, is bifurcated at both ends, is it not?

A. No, I wouldn't say it was bifurcated in the same sense that the lower arm is bifurcated; that is a standard double end pin connection.

Q. How do you draw a distinction between the two bifurcations?

A. Well, we could draw a distinction there in that we are merely making standard connections, while bifurcation means spreading out from one branch. He uses the word "bifurcation" in the patent, but he actually has strong lateral bracing out there. We don't come out here to get lateral bracing, we merely come in there.

Q. In other words, you bifurcate to the extent you require at one end, and to the extent that you require at the other?

(Testimony of P. R. Hines.)

A. I wouldn't in a machine-shop call that bifurcated ends because I don't think the man would know what I mean. We would call it a U-end or double I-end, or something of that kind of a pin in connection. Both ends are forked, but not for the same purpose.

Q. Now, that forked construction is shown substantially, is it not, in Defendant's Exhibit 8?

A. I don't see a forked construction there. I see a double arm. It is two arms connected by a spacing-block "e."

Q. And all united together?

A. Possibly it is, and possibly not.

Q. I call your attention to the fact that bolts are illustrated there.

A. Bolts may be loose in mechanism of that kind; may easily loosen up.

Q. I think you testified that this construction would obviously be a cast construction.

A. I can't say that two double arms going straight up are the same as a V going up to straight arm. I can't testify to that because my engineering knowledge doesn't permit me to.

Q. It is a very fine distinction, isn't it?

A. Between my distinctions?

Q. Yes.

A. No, it is not a fine distinction; it is a distinction well based on engineering principles.

Q. Dealing with that as a mere object of apprehension, wouldn't you say that two arms connected, united to an intervening spacing member would be

(Testimony of P. R. Hines.)

bifurcated at both ends if that spacing member were intermediate to the ends of the two arms?

A. I don't think I could say it was the same thing; it depends on whether you want to quibble over the definition of what is equivalent or equal.

Q. No, I am trying to save all the time I can, but I want to bring pointedly to the Court's attention what had been done. It was an obvious variation to cast a member in one piece or to make it a plurality of pieces bolted together?

A. If you wish me to say that forking or hooking a member in mechanics is something new, I will be glad to say that it is old and concede the point.

Q. You have testified, Mr. Hines, that the arm, the push-arm shown in the Cleveland patent had distinctive strength? A. Yes.

Q. Will you explain why the push-arm shown in Plaintiff's Exhibit 14, which is the plaintiff's latest design of machine as I understand it, is varied from the construction shown in the Cleveland patent?

A. That is Mr. Sumner's type of machine; this is not ours. This is a different machine; it is our exhibit, but it is a different machine.

Q. You are right. I am mistaken, and the exhibit I refer to is Plaintiff's Exhibit 19.

A. I think that could be better answered by an Allis-Chalmers man who designed the machine. This is an Allis-Chalmers machine designed under our license and patents; it was not designed by us. I do not see wherein it does vary, that is, the hook-

(Testimony of P. R. Hines.)

arm is the same. The large push-arm varies, that is a variation that I don't, perhaps, recognize as a variation; the distinction between this machine and that machine is the bearings have been split in two and moved out a little to get a nigger-bar up through, enabling the Allis-Chalmers people to use the arm as a connecting yoke. In other words, the shaft does not go straight through.

Q. There are two shafts instead of one?

A. The shaft goes straight through the hook-arm, but not straight through the push-arm. In respect to the push-arm, there are two shafts, with double bearing between, outside of the arms of the push-arm. Now, I don't believe that this question comes within the scope of the patent, as this is a later thought, an afterthought; the object of this push-arm is to put that nigger-bar cushion in there, and get the nigger-bar working up through. In the old days we put a large yoke around there—around the shaft and got the nigger-bar up through there, but this is much more convenient and works out very nicely in this particular type of construction.

Q. But in the case of the push-arm it cuts out these advantages which you have endeavored to point out in respect to Plaintiff's Exhibit 26?

A. Naturally if you wish a nigger-bar, it is more expensive; it makes a more expensive construction.

Q. Please answer the question.

A. We know from actual experience that this bed-plate costs more to build than the single bed-

(Testimony of P. R. Hines.)

plate, because in building this type, we naturally acquire these costs.

Q. I don't think it is necessary to further insist upon an answer to the question.

COURT.—No, I don't think so, either.

Q. Referring to this photograph, which represents Defendants Exhibit "B" of the interrogatories, please state whether this photograph shows the skids, as you have called them, and in operative relation to the mechanism shown in the patent.

A. Yes, this shows the skid by a line, and so marked. The skids are supporting beams or bars disposed substantially at right angles to the rock shaft, and the part called lift-bar is the part which lifts the logs from the skids in presenting them to the push-arms.

Q. This push-arm marked A in Plaintiff's Exhibit 19 is a bifurcated arm, is it not?

A. I believe it to be from the photograph shown, as near as I can tell. The hook-arm alongside it is also bifurcated.

Redirect Examination.

The advantages which I testified to as existing in the Cleveland construction were not done away with in the construction shown in Plaintiff's Exhibit 19. The advantages are not lost. In fact with the bifurcated arms straddling the bearings, if you didn't have that—if you had a solid arm, you would have to go to yoke; that is certainly a distinct advantage, and I think myself that this construction here is the greatest advantage there is to the Cleveland

(Testimony of P. R. Hines.)

patent; but it does not come up in this case, as this is an afterthought and is not in Claim 12. In either case you would have to connect the two divided portions of the shaft together in various manners. We don't always put in a nigger-bar; very many log turners up here in this country are not installed with nigger-bar, and we never use this construction except where they want the nigger-bar. There is an obvious advantage in this. If you don't use it you must use a yoke there, which is a long casting lug that comes out and connects the shaft ends, so the nigger-bar can work up through, and they used that for a long time that way.

Q. Have you explained with a little sketch what the yoke would be in this particular case to the Court? If not, I wish you would draw it on the back of that exhibit with a lead pencil.

A. Somebody has drawn it right here.

Q This drawing is on the back of Plaintiff's Exhibit 19. Please identify with numbers.

A. The old style construction we used a cast steel yoke.

Q. Mark that, please, with a letter.

A. "A," which is U-shape. The function of the yoke which is keyed to the shaft is to join the two ends of the shaft, so that they will work together, but allowing the passage of a nigger-bar, which is to be located across the axis of the main shaft; in other words, it is a method of splitting the shaft at that point, so as to give space for the nigger. In the construction shown here by photograph Plain-

(Testimony of P. R. Hines.)

tiff's Exhibit 19, the two shaft sections are connected by a bifurcated arm A which has the combined purpose of a connecting yoke and an arm.

Recross-examination.

I show you Defendant's Exhibit 22, and ask you to state whether in that Exhibit the effect of the yoke which you have described is not obtained through the push-bar and without the use of a yoke.

A. Why, I don't know. I can't see enough in the photograph to say. It seems to me that he accomplishes the same purpose but that he can do it with a cushion bar; I don't know whether he can or not.

Q. What do you mean by a cushion bar?

A. A cushion bar or floor plate for the nigger to work on, as she comes up to strike back against. I can't see whether he can do that or not without seeing more than the photograph.

Q. You have never seen this form of machine?

A. No, I have never seen this form of machine, and I can't testify from just this mere photograph. If you show me a blue-print I can tell you better than I can from this photograph. There is not enough information back in here for me to determine, back in there to see whether he can or cannot. As far as I can determine from an inspection of this exhibit I will answer yes to that.

Mr. ATKINS.—I offer in evidence certified copy of file-wrapper and contents of the patent in suit.

Marked Defendant's Exhibit 30.

Witness excused.

TESTIMONY OF D. B. HANSON, FOR PLAINTIFF (IN REBUTTAL).

D. B. HANSON, a witness called in rebuttal by the plaintiff, being first duly sworn, testified as follows on direct examination:

I am seventy-five years old last July. My residence is Portland, Oregon. I am familiar with the design and construction of sawmill machinery. I never had any experience in building machines of that kind. My experience has been in selling, installing and operating. I went to work for Singer, Davis & Company, Indianapolis, Indiana, in 1884, who manufacture sawmill machinery principally, all stuff in connection with it. I was with them close to two years; then went with the Allis Company of Milwaukee, now Allis-Chalmers Company; at that time was the E. P. Allis Company, when I went to work for them. I worked for them seventeen years in the capacity of assisting in designing and selling and installing band mills and other machinery of different kinds, sawmill machinery; principally selling and making plans for new sawmills and designing new machinery. I saw a copy of the Cleveland patent in the last few days. I didn't examine it particularly but I have examined photographs and blue-prints and observed at a distance these models you have here, and I have examined that machine you have over there.

Q. Assuming that you were called upon to install a log turning mechanism without the knowl-

(Testimony of D. B. Hanson.)

edge that you have gained here during the trial of this case, and your own experience, what arm would you choose or what construction would you choose with regard to bed-plate, and the operating arm mounted on the bed-plate connected to an operative cylinder?

Q. What I mean to say, choose from the standpoint of efficiency and obtaining the best results for which the machine is designed.

A. Well, I would take, on account of the arm itself more particularly than anything else, I would take the design shown in the bifurcated arm, Defendant's 26.

Q. Which of these two constructions would you install in a mill as a log turner.

A. I would unqualifiedly take that machine, Defendant's 26, for two particular reasons: The bifurcated arm spoken of here to my notion gives better strength, and then the whole thing looks more symmetrical, neater, more mechanically constructed, according to my way of looking at it.

Cross-examination.

(Questions by Mr. ATKINS.)

Comparing one with the other, Defendant's Exhibit 26 and Exhibit 27, please state whether you do not regard the two as substantially mechanical equivalents?

A. I do not. The arm on Exhibit 27 is not equivalent to the arm on 26 because it hasn't got the side strain.

(Testimony of D. B. Hanson.)

Q. Suppose it had the side strain; would you say it was equivalent?

A. That is a different proposition; if it had the side strain then it might be equivalent.

The COURT.—What would be necessary to give it the requisite side strain?

A. It would have to be webbed out on each side in some way so as to give side strain, give the strain as the log moved back and forward on the carriage.

Q. Suppose the arm had the hub shown in Defendant's Exhibit 28, would you regard the one as substantially equivalent to the other?

A. The additional length of the hub as shown there, to my notion, would not cut any figure at all; the weak point in the arm is between the hub and the piston up there, and the same weakness is in this.

Q. Suppose the arm, Defendant's Exhibit 28, were constructed as shown in Plaintiff's Exhibit 22 in black lines with the numbers 2′ and a2 added.

A. Well, that would be practically equivalent to this arm here, that bifurcated arm. Now, as far as strength is concerned for the movement this way, of course, that would be—give it practically the same strength as would be in the bifurcated arms, but it adds a lot of extra weight to it. The addition of such webs as a′ and a2 to Defendant's Exhibit 28 would be an obvious mechanical expedient, for increasing strength, a thing I have known for the last thirty or forty years, but would make an awful clumsy affair of it.

(Testimony of D. B. Hanson.)

Redirect Examination.

(Questions by Mr. GEISLER.)

My last answer was it would make an awful clumsy affair. I have been in the sawmill business a good many years and I notice that here on the Pacific Coast particularly they like nice looking machines. Mr. Sumner will carry me out in that statement; like nice looking machines. This machine would be a clumsy affair, all spread out, not symmetrical; the bearings, if you continue in that way would have to have the bearings way spread apart like this here and covers more ground; might go to work and core it out in here, take out a part like that, representing the inside of that red line, there, but then you get a bifurcated arm. In my opinion the right thing to do with that arm, assuming that the webs have been added, would be to core it out. Cut it out and make bifurcated arm of it, is exactly what I would do with it. The purpose of coring it out that way would be to lighten it up. I have no interest in this matter.

TESTIMONY OF AUGUST DEMANGEON, FOR PLAINTIFF (IN REBUTTAL).

AUGUST DEMANGEON, a witness called in rebuttal on behalf of the plaintiff, being first duly sworn, testified as follows on direct examination:

(Questions by Mr. GEISLER.)

My age is sixty; I live in Portland, Oregon. I am classed as a sales engineer. My business is engineer for sawmill machinery for Allis-Chalmers

(Testimony of August Demangeon.)

Manufacturing Company of Milwaukee, Wisconsin. They specialize in the manufacture of many lines of machinery, among other sawmill machinery, they specialize in the making of sawmill machinery as applied to the work on the Pacific Coast. I first worked at the machinist trade, beginning about the year 1880—along about the year 1880; I served my apprenticeship as a machinist, and during my early years as a machinist I worked in shops, and the chief business was the building of sawmill machinery; and along about the year 1887, I took charge of a machine-shop in the Tacoma Mill Company at Tacoma, Washington, and the purpose of the shop was to manufacture and repair sawmill machinery. About the years 1889, '90, '91 and '92, I was master mechanic, or I was the man in full charge of all the machinery, that is repair and operation, for large sawmill companies on Puget Sound. About the year 1902, I was engaged by the Allis-Chalmers Manufacturing Company of Milwaukee, Wisconsin, as sales engineer, and have continued in their employ until this tme, with the exception of about three years; during those three years, part of the time, I was superintendent of manufacture for what is now the Coos Bay Lumber Company, Marshfield, Oregon, and a little over a year of that three year period I was part owner of the Portland Machinery Company of this city. During all of this time mentioned, since I first went to work as a machinist, I have at times spent my days designing machinery or machinery parts, or devising methods

(Testimony of August Demangeon.)

for manufacturing lumber. My present occupation is one that requires me to spend half or more of my time in designing sawmill plants or sawmill machinery, or devices and methods for manufacturing lumber; the balance of my time is spent in endeavoring to sell machinery. During the last few years I have spent a good deal of my time designing, among other things, log turners, or trying to improve log turners. I am acquainted with the Cleveland patent on log turner, have known of that patent perhaps ten years. I first came to know of it through an advertisement. My attention was first called to it through an advertisement in the trade papers, and through catalogs issued by the manufacturers of the turner.

Q. State whether or not to your knowledge the Cleveland patent is well known on the Pacific Coast, with regard to logging appliances.

A. I consider that the Cleveland type of machine is well known and has been well known for the past ten or twelve years by those interested in lumber or its allied industries.

Q. Please state whether or not you find any advantage in the Cleveland type of push or hook arm over the prior devices that you have known of.

A. Well, in my judgment the Cleveland type accomplishes the object desired in the best possible manner; that is there is the greatest strength obtained at minimum cost; the arrangement is such that it occupies the least possible space and all strains are taken care of in the most direct and

(Testimony of August Demangeon.)

simple manner; any other method known at the present time would cost more to manufacture, would occupy more space in the mill, and would be, perhaps, a little more difficult to install; the foundation would need to be wider, and perhaps a little bit more expensive.

Q. Now, I show you here a blue-print, which corresponds to Defendant's Exhibit "B" attached to the interrogatories, and also illustrated by sketch attached to the deposition of Mr. Cleveland, and being shown on page 9 of his deposition. Are you familiar with the kind of log turner shown by that sketch and exhibit? A. I am.

Q. Please state what if any difference there is between that type of log turner and the Cleveland device.

A. The principal difference between the two is that the bed-plate in this turner is curved or crooked and the strains caused by the pressure of the steam are not taken up in a direct line with the way they are applied; they are not resistive in a direct line; the tendency when the steam pressure is brought to bear on the machine—the tendency of this design is to bring an unnatural strain on the bed; this strain tends to straighten up the bed, to take the position of a straight line, and consequently makes it liable to fracture; the pressure of the steam also tends to push this bed out of its proper and true position; the result of the pressure applied is a side strain on the bed. With the Cleveland design, the pressure of the steam is resisted in a

(Testimony of August Demangeon.)

direct line, or in the same line of its application; there is no tendency to distort the bed itself and cause fracture, and no tendency to throw it out of the true line in which it was intended to remain. The Cleveland method permits building of the machine with the least amount of metal and also giving the maximum strength. I believe the Cleveland model can be built at less cost and will answer the purpose in every possible way.

Q. I believe you have testified this is known to the trade as the crooked bed type?

A. Well, they know this machine as the Simonsen type; it seems that is the name by which it first appeared on the market. It afterwards became known as the crooked bed type of turner.

Q. Now, I show you here this Exhibit "A" attached to these interrogatories, and also Defendant's Exhibit 27, and will ask you whether or not you have seen a device—a log turner in other words, of the type shown by these exhibits. The blue-print which I show you here, constitutes Defendant's Exhibit "A"; now state whether you recognize that device there shown, that kind of a log turner—if you are familiar with it?

A. I first saw such a machine in British Columbia, New Westminster, approximately twenty years ago—approximately—and that is the only one I ever saw and that is all I know about it. I simply saw it twenty years ago. It didn't impress itself upon my mind particularly at the time.

Q. Now, comparing the device shown by the

(Testimony of August Demangeon.)

exhibit you last referred to with the Cleveland push-arm, state whether or not there is any advantage of the one arm over the other.

A. The advantage that appeals to me first of all is simplicity.

Q. In what machine?

A. Simplicity in the Cleveland machine, a single bearing in the Cleveland machine as against two bearings in this exhibit "A." Two bearings are entirely unnecessary when the work can be accomplished with one bearing; furthermore the arm being bifurcated and having considerable spread and supported each side of the bearing is stronger in my judgment than the type of arm shown in Exhibit "A." In other words, the purpose intended to be accomplished is accomplished in a simple and inexpensive and thoroughly satisfactory manner by the Cleveland design, and accomplished in a manner that I consider new and novel. At the time I first saw the Cleveland design I had never seen a similar combination of arrangement to answer the purpose.

Q. I call your attention to the Simonson Patent, Defendant's Exhibit 8, No. 448,591, dated March 18, 1891, and direct your particular attention to the arm there shown and as identified by E. Now assuming that the log turner shown by Defendant's Exhibit "A" attached to its interrogatories, were modified by an arm such as shown by arm E in said patent 448,592, what if any difference would there be in favor of this Exhibit "A" structure over the Cleveland log turner or *vice versa?*

(Testimony of August Demangeon.)

Assuming that the push-arm were made in Exhibit "A" like the arm E is shown to have been made in Defendant's Exhibit 8, namely, consisting of two pieces secured together by a spacing piece, state whether or not such a structure would be of equal advantage with casting bifurcated arms such as shown in the Cleveland log turner, that is the comparative merits of the arm shown in Defendant's Exhibit 8 and marked E with the arm No. 39, shown in the Cleveland model.

A. Well, arm No. 39 in the Cleveland model is a single piece arm, bifurcated at one end in order to accommodate a bearing. The arm marked E, Defendant's Exhibit 8 is two arms instead of one arm joined together by a spacing piece by means of bolts or rivets I judge by the picture, and is an entirely different appliance. The arm No. 39 in the Cleveland model, in my judgment, is a much stronger device than the arm E in defendant's model 8, less expensive to build and answers the purpose much better in every way.

Cross-examination.

(Questions by Mr. ATKINS.)

I have seen this Cleveland model in actual operation. The first one I remember seeing was at the National Lumber & Box Company, or National Lumber Manufacturing Company Mill, Aberdeen or Hoquiam, Washington, I don't remember which, on Gray's Harbor. I first saw that machine as near as I can tell you, maybe twelve years ago, and it was substantially like the model that is here.

(Testimony of August Demangeon.)

Q. State whether to your personal knowledge there has been difficulty experienced in respect to breakage of the arm 39 or 41 in the operation of the machine.

A. I have known of no breakage to occur on either one of the arms in the Cleveland machine, 39 or 41.

Mr. GEISLER.—Will you pardon me a moment. I want to ask the witness to explain this. I call your attention to Plaintiff's Exhibit No. 19 and to the arm or device therein marked A, please explain what that structure represents.

A. That arm is called the push-arm of the turner.

Mr. GEISLER.—What kind of a turner?

A. The Cleveland type of turner, manufactured by the Allis-Chalmers Company.

Mr. GEISLER.—Explain the particular construction there shown, and the purpose of it.

A. The construction shown is the same in principle as the Cleveland patent construction but the two sides of the bifurcated arm are spread more than in the Cleveland patent, in order to accommodate the spring cushion floor plates used in connection with the nigger, and in order to be able to locate that floor plate in its proper position.

Mr. GEISLER.—State whether or not at present it is sometimes found desirable to associate a nigger in a log turning device.

A. It is becoming quite necessary in this country to use a nigger in connection with the so-called Simonson type log turner, for the reason that much

(Testimony of August Demangeon.)

smaller logs are being brought to the mills to be sawn than formerly; it is becoming desirable to have both machines for use at any time.

Mr. GEISLER.—What is the function of the nigger?

A. The function of the nigger is the same as the function of the Cleveland and Simonson or Allis-Chalmers log turners—it is to turn the logs.

Q. (Mr. ATKINS.) Referring to the Cleveland patent in suit, Claim 12, please state whether that Claim calls for a single bearing at the outer end of the bed-plate.

A. In my judgment it does. It says "the bearing formed upon the outer end of the bed-plate." It says "the bearing" which I take to be one bearing.

Q. Unless it is construed to be a single bearing it would be substantially the same as the construction shown in Defendant's Exhibit 27, would it not —which I show you?

A. No, it would not. The construction shown in Defendant's Exhibit 27 is a solid or not bifurcated arm, whereas Claim 12 mentions a bifurcated arm and a single bearing; this is solid arm or single end instead of double end, and two bearings instead of one, having two bearings, the bed-plate shown in Exhibit 27 of course has one. And it would be a bed-plate provided at its outer end with a shaft bearing.

Q. Now, referring to the Cleveland patent again, that shaft 7 shown in that, that is the rock shaft, on which the push-arm and the hook-arm are keyed,

(Testimony of August Demangeon.)

that shaft that is, how is that in the full Cleveland machine carried upon the floor of the mill?

A. It is carried in a number of bearings, some of which are part of the bed-plate of the machine, and some of which are independent pillar block bearings.

Q. Can you say how many bearings there are for the accommodation of the ordinary length of shaft used in mills?

A. The number of bearings depends on the size and length of the machine, and the type of machine selected.

Q. That is the support of the shaft upon its base does not depend exclusively upon the bearings that are provided in the bed-plate?

A. No, it does not.

Q. Can you state in a general way how the number of bearings provided in the bed-plate compares with the number of bearings necessary to carry the shaft in its full extent?

A. That depends upon the type of machine. In this exhibit before me, No. 27, there are two bearings upon the bed-plate, and two bed-plates are required, one for the push-arm and one for the hook-arm. In the complete machine there would be two bed-plates which, in this type of machine would make four bearings. If the Cleveland bed-plate were used, there would be one bearing on each bed-plate, making two for the complete machine.

Q. How many bearings in all would be necessary to carry that shaft 7?

(Testimony of August Demangeon.)

A. That depends upon the length—overall length of the machine. For instance for handling short logs the only bearings necessary would be those in the bed-plates; for handling long logs the shaft would be longer and would require independent bearings aside from those in the bed-plates. I have never seen a Cleveland type of machine built for short logs. I have only seen those in use in this country, which are for long logs and which require bearings aside from those in the bed-plate. I never saw a Cleveland machine built with only the two bed-plate bearings for the support of the shaft 7. A shaft ordinarily requires one, two or three bearings depending upon the length of the logs to be handled. That would make in the case of the Cleveland bed-plate five bearings in it.

Q. Referring to Defendant's Exhibit 8, you have stated that the push-arm E is, in your opinion, not so strong as the Cleveland push-arm, 39. Is that correct? A. Yes, sir, that is correct.

Q. If this arm E were cast in one piece as the Cleveland push-arm 39 is cast, it would be as strong as the Cleveland arm, dimensions being equal, would it not?

A. If it has the same general proportions of design, it would be.

Q. So far as it shows a bifurcated arm it is substantially the same as the Cleveland arm?

A. This doesn't show—this Exhibit 8 does not show a bifurcated arm. It shows two arms instead of one single arm. It has two arms.

(Testimony of August Demangeon.)

Q. And they are united into a solid structure by a spacing block "e," are they not?

A. They are not united in a solid structure at all.

Q. The specification says that the block "e" is secured between arms E?

A. I say that it is not a solid structure. By the term solid I mean one-piece structure.

Q. Then you mean a one-piece structure?

A. It is a built-up combination of two arms with a spacing-block.

Q. You don't intend to say, do you, that the building of such a structure by casting in one piece would be novel; that a structure could be cast in one piece as well as built up, couldn't it? A. It could, yes.

Q. And there would be nothing extraordinary about that if one wanted to build it that way?

A. No, sir.

Q. Perfectly well known in the art at the time that patent was granted to Simonson, that is in 1891?

A. What was perfectly well known in the art?

Q. The art of casting a device in one piece or building it up of a plurality of pieces?

A. Yes, sir.

Witness excused.

Plaintiff rests.

TESTIMONY OF T. B. SUMNER, FOR DEFENDANT (IN REBUTTAL).

T. B. SUMNER, a witness called in rebuttal by the defendant, having been previously sworn, testified as follows, on

Direct Examination.

(Questions by Mr. ATKINS.)

I heard Mr. Hines, a witness for the plaintiff, testify that in arriving at the best results in designing machines he employed drawings and theory and submitted them to a practical builder, or particularly to the casting department of his work. My experience relates to the practical manufacture of log turner. I have spent my whole life since a boy in bringing out and manufacturing machinery and more especially—we moved to Everett thirty-one years ago and been there in that sawmill line and shingle-mill. In my building of log-turners I have observed many breakages of the push-arm or hook-arm in this type of turner. I don't think it is confined to any one manufacturer; we have furnished new arms for the old Simonson type, made by Challoner of Oshkosh; we have furnished arms for turners made by Allis-Chalmers; we have furnished arms for turners made by ourselves. It isn't confined to any one particular manufacturer. They have not always been confined to one particular place, but more so to one particular place, that is to one part of the arm.

Q. Have the breakages that you have observed

(Testimony of T. B. Sumner.)

occurred transversely to the axis of the rockshaft or longitudinally with reference thereto?

A. I can't call to mind of ever seeing a fractured arm, that I noticed the fracture, that it would be parallel to the shaft; it has always been parallel with the cylinder, so that it would indicate that when the strain came and the breakage occurred it was always in the turning or the pushing of the log. When the log-turner is in position, the carriage is above the shaft of course here. The operator to-day becomes so expert—I might say that so far as the practical workings of the turner as we build to-day over the old Simonson turner, it practically has no new features; the only thing that we have been trying to do would be merely to possibly simplify it a little and to strengthen the parts that have broken. Now, the old Simonson will reach over and catch a log and turn it to you and push it back just as well as the present turner, but with the present operation and the speed that the mills are all trying to get up to, the operator, that is the sawyer, becomes so expert that he will reach over with the hook-arm catch that log turn it towards you, turning it towards you before the log comes clear down; he catches it with the arm and pushes it back against the knees of the head block; doing that it throws the arm up in this place where they are usually broken. We have had breakages in the hub, but more breakages up in this position here, and never have any—I can't recall to mind ever noticing the fracture of the steel to see in what position, if we

(Testimony of T. B. Sumner.)

could, that the arm was broken so as to strengthen it. We have repeatedly kept adding to the power, strengthening this way, strengthening this way to take—to strengthen it, pushing in line with the cylinder, transversely to the axis of the rock of the shaft, that is in line with the operation of the cylinders and of the piston rod, and I can't call to mind ever a broken casting come in to replace where the fracture shows that it was caused by anything that might be on the log and striking this as the carriage passed forward and back. In my judgment, the log couldn't be retained on the head block and cause a fracture of either the hook-arm or the push-arm. Now, we have had these—this same thing broken, the bed-plate, so bringing it out here has not done away with the trouble, referring to Defendant's Exhibit 26. We have located a great deal of the trouble of broken beds. I think it may not have been made clear to the mind of the Court; the log, when it is operated upon by the turner is held in operative relationship to the push-arm and hook-arm. I will explain briefly how the log is held so that it receives the turn we will say from the hook-arm. It is turned with the hook-arm, it goes over and finds the log like that. It is practically held up here on the knees on the carriage. As I say, the breakage is caused—if I had a square block I could —as this comes over and catches this and it rolls this way, and being so expert when this is rolled over they will catch this and throw it back before it comes down on to the trip skids. The hook block

(Testimony of T. B. Sumner.)

drops out of the way just substantially the time that the push-blocks begin to drive it forward if he so operates that. That is the ideal operation, then he takes the push-arm and pushes it back against the knees. I have located the cause of breakage in the arms in the bed-plates. All the objections that have been brought out seems to be along the lines because the bed-plate on the old Simonson turner was crooked. That is a mistake. I dare say that if you will take an old Simonson to-day with the crooked bed-plate and take the improved skid-lift, attach it to the old Simonson turner, I don't believe you will have any broken beds, for this reason: that under the old type in the raising of the skids the cams were on the main shaft; then as you would roll that and raise the slids up and the logs were turning away, all pounding was on the trip skids and the skids rested on the main shaft. When one of those immense logs is turned over and it comes down smash on the skids; the trip-skids are skids that are located on the sides here; that is supposed to take in modern practice now—actuated by a single cylinder—it takes this heavy pounding and this heavy jar off from the bed. Under the old method it was all on the shaft because the cams were all on the main shaft, and the end of the skid rested on the cams so the whole pounding the full force of the blow was always on the shaft, and that was what happened; the crooked arm having such a small bearing on the wood, with this constant pounding kept pounding the narrow end of that into the

(Testimony of T. B. Sumner.)

wood, and that was what caused the breakage; it wasn't because it was crooked, because the strain was endwise or the reverse. There was material strain lengthwise of the bed-plate in the operation of this machine to a certain extent; there is steam pressure, and it would be strain back this way; the strain here to a great extent is relieved with the exception of what might be caused by the fulcrum here drawing back. The pounding strain is not a strain on the bed-plate, forward and back as it were; it is pounding up and down, and pounding the narrow end into the wood, allowing it a chance to play, or if they kept tightening it up, to put a curve in the bed, which causes it to break; invariably they break up here. It is the same thing we have had broken under the old type which were first built for the Muckletoe Lumber Company; has one of this type broken in here. From my observation the breakage of the bed-plate comes from the driving from above, I think ninety per cent of it. For this reason, were all getting,—if you will notice we have always—that is what called our attention to bring out, widen out—widen out the bed; you might see a circular what we have, shows you we have been working along that line, in that wide double bed which was put in at the Snoqualimie Lumber Company Mill—I think was built either eight or nine or ten years ago; I think it was somewhere about eight or ten years ago. There is where we brought out the bed, widened it out—the bed outwards; we have some have not been of the

(Testimony of T. B. Sumner.)

Cleveland type bed. The idea is to cover more surface to resist that pounding. The effect of the pounding upon the bed-plate naturally breaks it sooner or later, not the strain lengthwise of the bed-plate or crosswise of the bed-plate; I don't think that had very much to do with the strain lengthwise. The breakage strain comes from bending the bed-plate down into the wood upon which placed, and being loose, unless they kept the bolts tight, but if they kept the bolts tight, it would put a curve in this end of the bed. That would be proven by nearly all of them breaking through here. That is the result of my experience and observation. We tried to have them send in the old casting on the arm that we might notice the fracture and try to locate where it broke, and if we can see the break try to straighten the pattern and overcome the breakage if possible. In the improved skid-lift the tendency to breakage in the bed-plate is greatly relieved. I will explain the development of our log turner. (Circular received in evidence subject to plaintiff's objections and marked Defendant's Exhibit 31.) Referring to the yoke that was in the main shaft in order to use a nigger, the main objection to using that yoke in the main shaft was for the reason that you had to place that back of the push-arm. If you placed it back of the push-arm, it naturally came too far back for the center of the log; therefore it was necessary to run the carriage farther back in order to get the center of the log to operate the nigger. Referring to De-

(Testimony of T. B. Sumner.)

fendant's Exhibit 31, I find there a diagram of the yoke referred to yesterday; now that being placed so far back, as I have said, that if it was an ordinary log, in order—it is for the purpose of bringing the nigger-bar up through for turning small logs, as Mr. Demangeon testified.

COURT.—Is there room to place it between the hook-arm and the push-arm?

A. No, it wouldn't do there; then we conceived the idea of bringing the nigger-bar up through the push-arm; we brought out that idea. We abandoned the yoke; we had then one continuous shaft and it brought the nigger in a better position for the center of the log, but it never had been probably thought of, the design, until we brought it out; it is shown right here; it is shown there. Plate 2; by making the bed wider, not only for this purpose but to resist this strain of constant pounding and bringing the nigger-bar up through the center of the push-arm; that was taken from the photograph of the machine that went into Snoqualmie. It was built either eight or nine or ten years ago. The Snoqualmie Falls Lumber Company were the originators. The effect of the push-arm shown in Plate 2 of your Defendant's Exhibit 31 was to combine in the push-arm a yoke and it was to relieve the necessity of a separate yoke and put it in the push-arm, combining the two in one, and bringing it in position farther forward, so as not to be necessary to run the carriage farther back in order to get the center of an ordinary length log. It was to elimi-

nate the yoke by combining the two in one. We not only got that but we got greater surface on the wood to resist the pounding if it should be installed with the old style cams.

Witness excused.

Defendant rests.

There was also duly taken the deposition of Charles E. Cleveland as a witness on behalf of the plaintiff, pursuant to the agreement of the parties, before Bessie Whitmire, a notary public, November 14 and 15, 1923, at Dothan, Houston County, Alabama.

DEPOSITION OF CHARLES E. CLEVELAND, FOR PLAINTIFF.

Said CHARLES E. CLEVELAND being duly sworn deposed as follows:

My name is Charles E. Cleveland, my age is 62; I reside at Kendallville, Indiana, and am a retired manufacturer. I am the same Charles E. Cleveland who obtained U. S. Patent Number 933,231, granted September 7th, 1909, for log handling mechanism.

Printed copy of said patent identified by witness and marked Plaintiff's Deposition Exhibit "A."

I am not the present owner of this patent. I sold the same to D. J. Murray Manufacturing Company, a corporation of Wisconsin.

Q. I hand you a paper writing purporting to be an assignment of this patent Number 933,231, among others to the D. J. Murray Manufacturing Company, and would ask you to identify same.

(Deposition of Charles E. Cleveland.)

A. This is the assignment to said corporation of the above-mentioned patent. It is dated March 30, 1917, and signed by me.

Copy introduced by agreement of Counsel, with the same force and effect as the original would have if introduced in evidence and copy marked Plaintiff's Deposition Exhibit "B," by the notary.

I have handled log-handling mechanism over a period of approximately twenty years, prior to April 13th, 1909, because of my being engaged in the designing of sawmill machinery. I have eight or ten other inventions relating to log-handling or sawmills mechanism, and I obtained U. S. Patent for all of these inventions. Referring to claim twelve of the patent Number 933,231, this claim refers to the combination of the bed-plate 3 or 4, provided at its outer end with a shaft bearing marked 8, with its shaft, 7, extending through said bearing. The arm number 39, or 41, the said arm being bifurcated and straddling the bearing formed upon the outer end of the bed-plate. The power cylinder 38 or 40, pivotally mounted upon the bed-plate. The piston rod 47 (only one being numbered) working in the cylinder and connected at its outer end to the adjacent end of the arm, 39. (The piston rod 47 is connected to the oscillating casting holding the hook, 42.)

Q. Will you state generally the circumstances surrounding the conception and development of the invention defined by this claim twelve.

A. (By way of Explanation.) Simonson's Log

(Deposition of Charles E. Cleveland.)

Turning Machines, are known in the art as a particular type of machine, regardless of who the manufacturer is, and in referring to my invention, I use the name of Simonson Turner broadly. Some time after Mr. Simonson secured patents on his turner Numbers 408,760; 448,588; 448,590; 448,593; Mr. Simonson called at Fon du Lac, Wisconsin, and endeavored to arrange with DeGrote Giddings & Lewis, to manufacture his turners. About that time or shortly after, I was employed by the said DeGrote Giddings & Lewis, as sawmill machinery designer, and while the said DeGrote Giddings & Lewis were not interested and did not care to manufacture the turners for Mr. Simonson, it caused them to think seriously of manufacturing heavy sawmill machinery for the Pacific Coast, believing it was a good field for their operation, therefore they discussed from time to time with me the designing of machinery for that purpose. Therefore, when the Simonson's patents were about to expire we gave serious thought to the design of an improved Simonson turner, and this led up to my invention and subsequent patent. I first conceived the invention defined by said claim 13 the first of 1907. I fix this time in my mind because at this time Giddings & Lewis Manufacturing Company by whom I was employed were desirous to vigorously work the Pacific Coast Trade, and desired that I complete the working drawing of an improved Simonson turner. I first disclosed the invention defined by said claim 12 to others some time in

(Deposition of Charles E. Cleveland.)

January, 1907. This disclosure was made to C. F. Larzelere, Uric Anderson, and to H. W. Cleveland, my son. Mr. Larzelere was the Superintendent, Uric Anderson and my son, H. W. Cleveland, were draftsmen for Giddings & Lewis Manufacturing Company. I believe C. F. Larzelere is now at Flint, Michigan. The whereabouts of Uric Anderson is unknown. My son H. W. Cleveland is at Wausau, Wisconsin. The first drawing of the invention defined by said claim 12 I made some time in January, 1907. I have not this drawing with me. All my memoranda is at Kendallville, Indiana. I was only notified Nov. 7 that my deposition would be taken here and have not been at Kendallville since. The first log turner embodying said claim 12 was built and shipped to the Albion Lumber Company, Albion, Mendocino County, California, January 20th, 1909. This log turner was successfully operated. I cannot remember the number of log turners subsequently installed but there were certainly quite a few, among which, one was shipped to Portland Machinery Company, Portland, Oregon, and another to Brace & Hergert Mills Company, Seattle, Washington. The actual construction work began about October 1st, 1908, on the turner shipped to Albion Lumber Co. D. J. Murray Manufacturing Company in a letter dated December 12, 1922, to me asked me for practically the above information, and with considerable effort I took the matter up with Giddings & Lewis Manufacturing Company, asking them for the dates that

(Deposition of Charles E. Cleveland.)

the first turner was made and shipped, and a copy of this letter I brought with me, and from which I quoted. The object of the invention defined by said claim 12 was to build a machine having a stronger arm either for the push-arm or hook-arm, and the construction shown in my invention was much stronger arm than any other in use at that time.

All of the turners of which I had knowledge at the time I brought out my invention had straight arms with a single bearing on the shaft. Now, it is a well-known fact that the weakest part of the log loader arm is near the shaft, and not in fact near the top of the arm. It was therefore my intention to construct an arm that was stronger near the shaft, or in my belief the weakest part. This I accomplished by making an arm having two bearings on the shaft in place of one, or, bifurcating the lower end of the arm. At the time I conceived my invention, in the year 1907, I saw the Simonson's Log Turner constructed by the Challoner Machinery Company of Oshkosh, Wisconsin. and later saw them in actual use in a number of sawmills on the Pacific Coast. These Simonson turners worked successfully in a general way, but in visiting the sawmills on the coast, I was visibly impressed with the number of broken log loader arms generally laying around these mills. The bed-plates as contained in the Simonson machines were all built with an offset, or, in other words, the bearing at the end of the bed-plate in which the shaft rotated, was not in a center line

(Deposition of Charles E. Cleveland.)

with the steam cylinder, but was to one side of the same. The arms were constructed with a single bearing on the shaft, as shown in Defendant's Interrogatory Exhibit "B." The number of broken arms I observed around the mills prior to the conception and development of my invention influenced me in constructing the pusher and hook arms with a double-bearing on the shaft, or, in other words bifurcating the shaft end of the arm. The differences between the Simonson bed-plate, and its bearing and the bed-plate, bearing and arm connection, as developed by me and defined in said claim 12 is this: The original Simonson as before stated, has a bed-plate with the shaft bearing offset to one side of the center of the cylinder, whereas in my construction the shaft bearing of the bed-plate is in direct line with the center of the cylinder and push-arm, and thereby equalizes the strain. The advantages I proposed to secure by the changed construction was to get a stronger and more symmetrical machine. By making the arm bifurcated and thereby having a more substantial bearing upon the shaft, and a stronger arm, and having the shaft bearing on the end of the bed-plate in direct line with the center of the cylinder, which construction was better to withstand the thrust of the cylinder. The primary cause of breaking the arm of the old Simonson turner was because of poor design. The arms were all straight arms, whereas, in my construction the arms to which the piston rods are attached have a double bearing on the shaft,

(Deposition of Charles E. Cleveland.)

allowing for a more secure attachment to the shaft, straddling the end of the bed-plate, coming together and forming a single arm from about midway to the top of the arm. This construction permitting a more equal distribution of the metal, and thereby making a broad, deep, and strong arm. I also observed that other parts associated with said arms were broken, principally the bed-plates. By my invention I intended to correct this condition by making a so-called "straight line," bed-plate, with practically all strains in a straight line. It is a well-known fact that a bed-plate constructed on a curve, or as I called it a crooked bed-plate, when the strain is applied has a tendency to straighten out, therefore, it is not as strong a construction as a bed-plate built on a straight line principle, as my construction is.

I am in the south at the present time because my physician thought it would be beneficial for me to spend this winter in a warmer climate, my home being in Indiana.

Cross-examination by Mr. ATKINS.

By a designer I mean a man who originates and who details, or makes the detail drawing. I attended to that. My activities covered practically all of the United States and Canada.

Q. In your answer 25, you refer to a letter as giving the dates of construction of your turner as you have testified. Without that letter would you be able to fix by personal knowledge and recollection only, any of these dates?

(Deposition of Charles E. Cleveland.)

A. Not very accurately.

I do not know whether the first drawing of my invention is in actual existence. My object in constructing the subject matter defined in claim 12 of the patent in suit was not only to make a stronger arm, but to arrange the same to be in direct line of the forces exerted on it, and therefore more equally distribute the forces.

Q. Did you introduce any new principle of operation into the Simonson log turner by your invention, so far as it is defined in claim 12?

A. I do not think that a new principle was introduced, as I understand it, by my invention. My improved log turner so far as defined in claim 12 turned the log in the same way as the old Simonson turner, but by a mechanism, which I regard as better. When I made my invention I did not know of any straight bed-plate in the Simonson type of turner, or of a bifurcated hook-arm in that type of turner.

(Witness is shown copy of patent (No. 10) Simonson, No. 448,592, issued March 17, 1891.)

I do not find in the drawings of this patent a bifurcated hook-arm. It is not a bifurcated arm in the sense that my design of the hook-arm is, as mentioned in claim 12. The arm E shown in figures 1 and 2, of this patent is a bifurcated arm to the extent only, that it has a divided bearing upon the shaft. The arm E shown in the Simonson patent #448,592, illustrates two separate arms, with a distance piece bolted between these

UNITED STATES PATENT OFFICE.

ISAAC H. COLLER, OF POUGHKEEPSIE, NEW YORK.

IMPROVEMENT IN HARVESTING-MACHINES.

Specification forming part of Letters Patent No. **48,658**, dated July 11, 1865.

To all whom it may concern:

Be it known that I, ISAAC H. COLLER, of Poughkeepsie, in the county of Dutchess and State of New York, have invented a new and useful Improvement in Pitman-Connections of Reaping and Mowing Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a perspective view of my invention, as applied for the purpose intended. Fig. 2 is a top view of my invention disconnected from the cutter-bar of a harvester. Fig. 3 is vertical section in the line *x x* of Fig. 2. Fig. 4 is a plan or top view of a harvester with my invention applied to it. Fig. 5 is a front view of the same.

The same letters of reference in the several figures indicate corresponding parts.

In the practical operation of reaping and mowing machines it is found that considerable friction is induced at the point where the pitman-rod of the cutter-bar connects with the crank-pin of the driving-shaft. This is due to a deflection of the cutting device out of a plane with the pitman-rod, such a deflection being produced by the resistance of the standing grain as the harvester moves forward. This friction I propose to obviate, and still use the simple and almost universally adopted pitman contrivance, without increasing materially the cost thereof.

The nature of my invention consists in the application, between the harvester-sickle and the crank or eccentric of the pitman-shaft, of a sleeve which has an auxiliary box at right angles and exterior to its bore formed on it, for the connecting-pin of the harvester-pitman to pass entirely through and work in.

To enable others skilled in the art to make and use my contrivance, I will describe the same with reference to the drawings.

I have shown the pitman-shaft in Figs. 1, 2, and 3, as being arranged horizontally; but it is obvious that it can be placed in a vertical position if the heel of the sickle-rod is perforated vertically, or without this change if the forks on both ends of the rod are in the same plane.

A is the eccentric or crank shaft which drives the sickle. It is shown applied on the gear or main frame of a harvester in the usual manner. The wrist-pin *a* of this device A is made longer than usual.

B is the sickle or cutting device.

C is the pitman-rod. Its inner end, *b*, is forked; so, also, is its outer end, *c*. The latter forked end is formed by cutting out the metal horizontally, the former by cutting it out vertically. The prongs of one fork, therefore, are at right angles to those of the other. The fork *b* straddles the heel of the sickle-rod, and is confined by a pivot, *f*.

D is the sleeve, which fits loosely on the wrist-pin. This sleeve is cast with a vertical bore, *d*, and therefore is enlarged near the middle of its length and exterior to its bore *g*, as represented at *m*. By thus enlarging the sleeve the bore *d* can be entirely through the sleeve, and there will be sufficient strength in the sleeve to support the strain that may come upon it at any point.

It is essential to use a through-pin, *s*, for connecting the pitman-rod to the sleeve, as this pin has to bear much strain. By using a pin that passes entirely through the enlarged part of the sleeve I am enabled to make the pin of wrought-metal, and very firmly secure it in place. If two small cast pivots or even wrought pivots were used centrally over and under the bore *g* of the sleeve, they would either break off or soon become rickety. The connection at this point must be strong and durable, and hence I adopt the plan of construction designated by the letters *d m*. When the sleeve D is fitted on the wrist-pin *a* the fork *c* is made to straddle it, and the through-pin *s* is inserted, as represented in Fig. 3.

Keys may be passed through the ends of the pin *s*, or the ends may be riveted upon the prongs of the fork *c*.

By examining Fig. 2 of the drawings, it will be seen that the pivotal connection *s* allows the pitman at its inner end to move backward, as illustrated in red, in case the cutting device is deflected by the standing grain.

It will also be evident that the pitman has freedom, as usual, to turn on the wrist-pin *a* of the crank-shaft A whenever the cutting appa-

arms, with a distance piece bolted between these

THOMAS W. GODWIN.

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Improvement in Oscillating Engines.

No. 121,355. Patented Nov. 28, 1871.

Defts' Ex. 2.

Fig. 1.

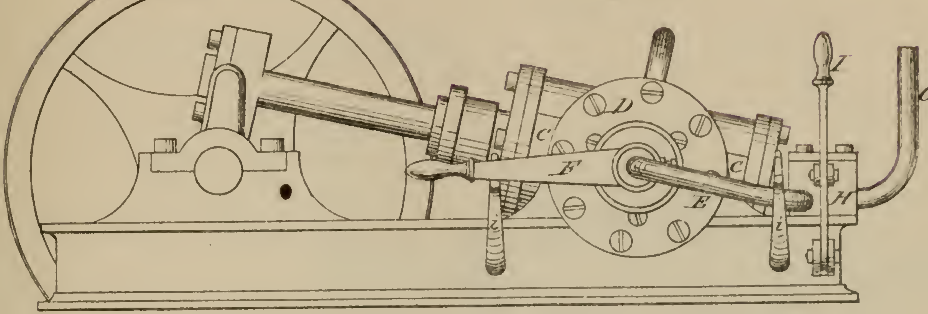


Fig. 2.

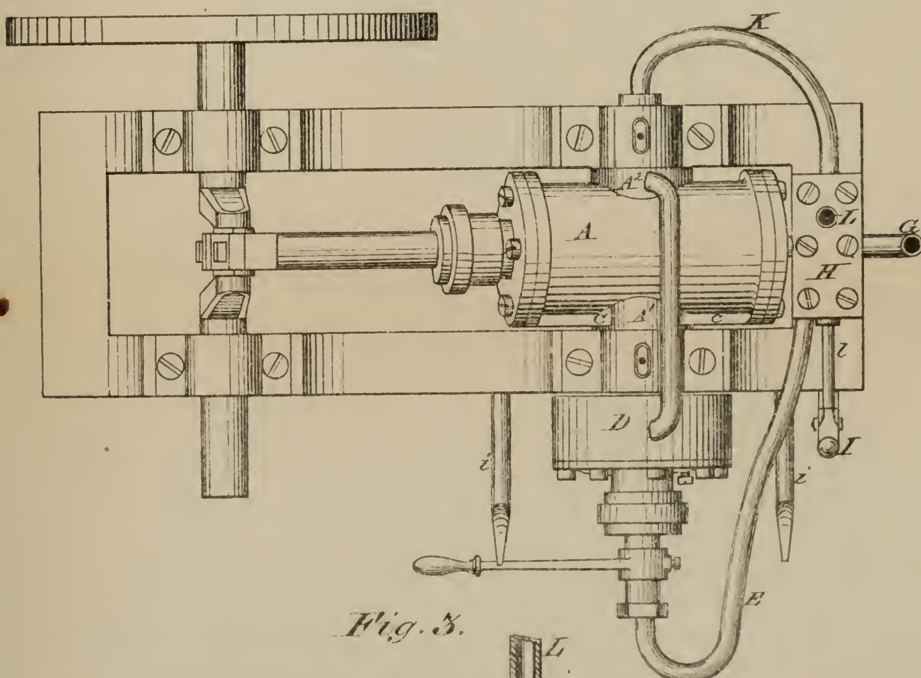


Fig. 3.

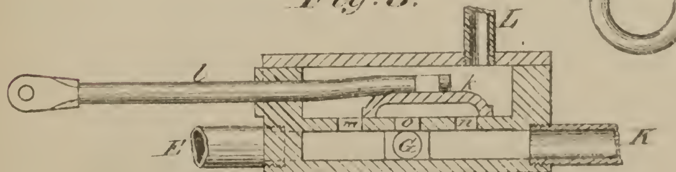
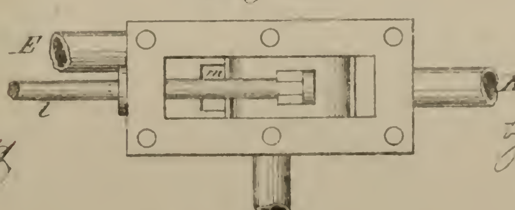


Fig. 4.



Witnesses:

O. E. Duffy

J. C. Brecht

Inventor:

Thos W. Godwin

by Lomus & Co

his Attorneys

upon the shaft. The arm E shown in the Simonson patent #448,592, illustrates two separate arms, with a distance piece bolted between these

THOMAS W GODWIN.

Improvement in Oscillating Engines.

No. 121,355. Patented Nov. 28, 1871.

Fig. 5.

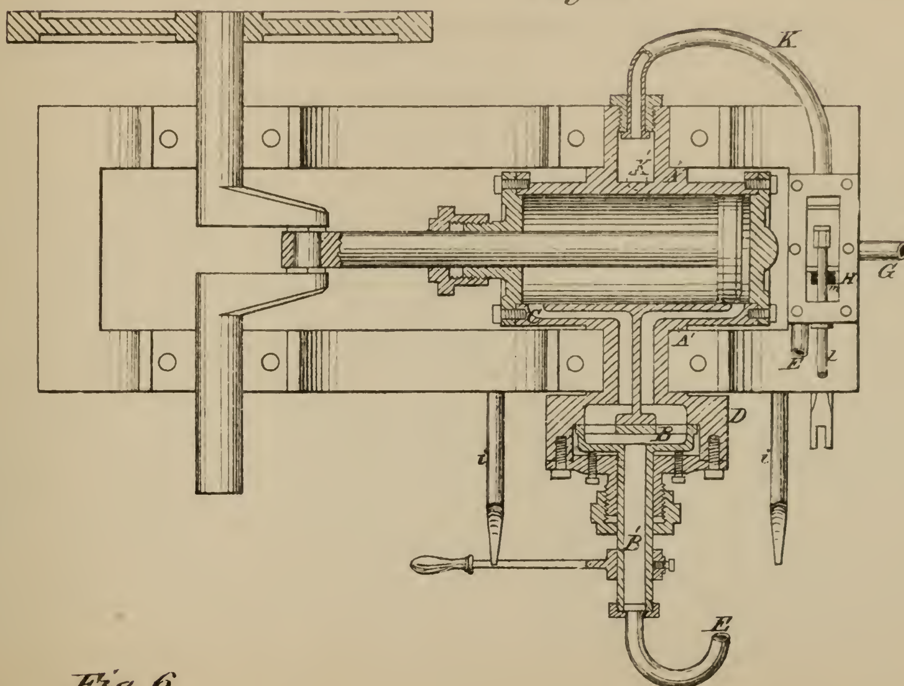


Fig. 6.

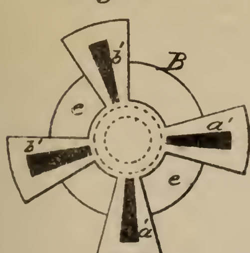


Fig. 8.

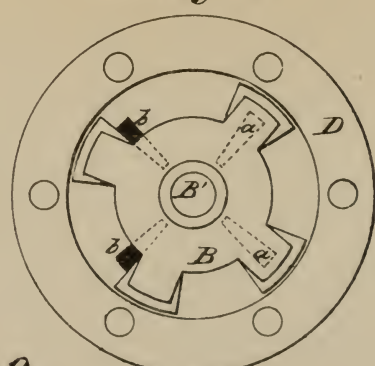


Fig. 7.

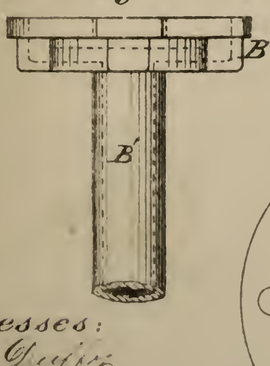
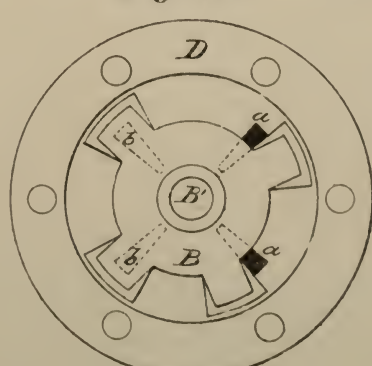


Fig. 9.



Witnesses:

C. E. Duffy

T. E. Brecht

Inventor:

Thos W Godwin

by Munn & Co.

His Attorneys.

monson patent #448,592, illustrates two separate arms, with a distance piece bolted between these

UNITED STATES PATENT OFFICE.

THOMAS W. GODWIN, OF NORFOLK, VIRGINIA.

IMPROVEMENT IN OSCILLATING-ENGINES.

Specification forming part of Letters Patent No. 121,355, dated November 28, 1871.

To all whom it may concern:

Be it known that I, THOMAS W. GODWIN, of Norfolk, in the county of Norfolk, and in the State of Virginia, have invented a new and useful Improvement in Oscillating Steam-Engines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing making a part of this specification.

My invention relates to oscillating engines; and consists in a peculiar construction and arrangement of valves in connection with the piston-cylinder, as hereinafter more fully set forth.

Figure 1 represents a side elevation of my improved engine. Fig. 2 is a plan of the same. Fig. 3 is a sectional view of the steam-chest H. Fig. 4 is a plan of the same with the cover removed. Fig. 5 is a horizontal longitudinal section. Figs. 6 and 7 are views of the valve and stem. Figs. 8 and 9 are views of the interior of the steam-chest D, showing the steam-valve with two ports open in each figure in different positions of the cylinder. Fig. 9 is a vertical section of the steam-chest D and valve B. Fig. 10 is a rear view of the valve B, the openings on the face thereof being represented by dotted lines.

The steam-cylinder A, trunnions A^1 A^2, and steam-chest D are cast separately or in one piece, one end of the latter forming the valve-seat, in which are four ports, *a a b b*, for the ingress and egress of steam. The trunnions are made hollow, A^1 being divided by a partition, so as to form two chambers or passages for steam, each communicating with the chamber *c*, which is formed upon and opens into either end of the steam-cylinder A. This chamber *c* also has a partition across its center opposite to and against that in the trunnions. The valve B consists of four slotted arms projecting from a hub to the inner circumference of the steam-chest. The slots *a′ a′ b′ b′* form the openings to correspond with the ports *a a b b*. Attached to the rear of this valve is a hollow disk, *e*, provided with shorter arms which project over the slots aforesaid, and are channeled so as to conduct the steam into or from said hollow disk which opens into the hollow valve-stem B′ extending through the cover of the steam-chest D, and communicating, by means of pipe E, with steam-chest H. Between the inside of the cover of the steam-chest D and the chamber *e* is a metallic washer or ring, which is made to press the valve closely against its seat by means of set-screws, as shown in Fig. 9. The lever F attached to the stem serves to adjust the valve, and is held in position by the notches in the ends of the lugs *i i*. The arrangements within the steam-chest H are clearly shown in Figs. 3 and 4. The horizontal partition or valve-seat is provided with openings *m n o*, communicating, respectively, with pipes E, K, and G. The valve *k* is the ordinary slide-valve used in stationary engines, and has attached the arm *l* operated by the lever I. The pipe L communicates with and conducts the steam from the boiler.

The operation is as follows: The steam is admitted through the pipe L, the valve *k* being in the position shown in Fig. 3, and is conducted through the opening *m*, pipe E, and valve-stem B′ into the slotted arms of the valve B, where (the cylinder and piston being in the position shown in Figs. 1 and 2) it finds the apertures *a′ a′* in the arms opposite to the ports *a a* in the valve-seat, through both of which it passes, and, after traversing the right-hand passage of the trunnion and division of the chamber *c*, enters the cylinder A through the opening at the rear end of said chamber. In performing its office upon the piston the cylinder is oscillated, producing a corresponding oscillation of the valve-seat and its ports, which closes the openings *a′ a′*, opens the ports *a a* into the steam-chest, and brings the ports *b b* opposite the apertures *b′ b′*, through which the steam is now conducted to the forward end of the cylinder A, and, acting upon the piston, causes the exhaust steam from the opposite end to enter the steam-chest through the port *a a*. Thus at each stroke of the piston the two apertures *a′ a′* of the valve open and close alternately with those marked *b′ b′*, while two of the ports *a a b b* alternate with the other two in communicating with said apertures and in opening into the steam-chest. The exhaust steam is conducted from the chest D through pipe K′, trunnion A^2, and pipe K back to steam-chest H, passing up through opening *n*, under valve *k*, down through opening *o*, and out through exhaust-pipe G. The engine may be reversed by changing the lever F from one lug to the other, or by taking hold of the lever I and drawing the rod *b*, which moves the valve *k*, whereby the opening *n* is uncovered, permitting the

monson patent #448,592, illustrates two separate arms, with a distance piece bolted between these

steam to pass directly into the pipe K, through trunnion A^2 and pipe K′ to steam-chest D. The projecting arms of the valve B being, as before stated, so arranged that the apertures in two of them are opposite two of the ports while the other two face the solid surface of the seat, the latter in this case permit the two open ports to take steam for one end of the cylinder A, while the other two conduct the exhaust steam from the opposite end. It then passes through the valve-stem B′ and pipe E into the lower division of box H, up through opening *m*, under the valve *k*, and out as before through opening *o* and exhaust-pipe G.

I claim as my invention—

1. The valve B and oscillating seat, herein described, in combination with the steam-chest D, substantially as set forth.

2. The oscillating valve-seat and valve, constructed as described and shown, in combination with the steam-chests D and H with intervening steam-pipes E K K′.

3. A stationary steam-valve with projecting hollow arms at irregular distances, for the purpose of conducting steam to the piston-cylinder or exhausting it therefrom, substantially as described.

4. The arrangement of the hollow valve-stem B′, hollow trunnions A^1 A^2, steam-chest D, and valve B having hollow arms, all constructed and operating substantially as shown and set forth.

THOS. W. GODWIN.

Witnesses:
D. E. SOMES,
F. C. SOMES.

(150)

to the extent only, that it has a divided bearing upon the shaft. The arm E shown in the Simonson patent #448,592, illustrates two separate arms, with a distance piece bolted between these

(Deposition of Charles E. Cleveland.)

two arms. The above-mentioned arms are perfectly straight, from the shaft upward, whereas, the arm shown in the Cleveland patent in suit, and marked 39, is an integral casting, having a fork lower end for attaching to the shaft.

I understand the definition of bifurcate is to divide in two directions. The arm E referred to in the Simonson patent last named as before stated is simply two arms extending in the same direction to the shaft. I claim that my hook-arm is stronger, not only because it is attached to the shaft by two bearings, but also the fact that these two bearings extend upward and diverge into a central arm, all forming an integral part of the arm. It is not a mere question of the weight of metal. The design has everything to do with the strength or a casting or similar parts, for instance a board is much stronger placed on edge or will sustain a greater weight, than if the board is laid flat and the weight applied. Therefore in designing this arm in question I place the member with a greater distance crossways the shaft, and which would be stronger than for instance a square arm containing the same amount of metal. I do not wish to be understood as stating that an arm would be strengthened by cutting out a portion of it at its bearing end to effect a bifurcation. Design has everything to do with the strength of materials. The mere taking, for instance of a square bar, and slotting one end of it without an equal distribution

(Deposition of Charles E. Cleveland.)

of the metal, would weaken it as a whole, and for the purpose intended.

Witness here shown photograph marked Defendant's Deposition Exhibit "B," and being the identical photograph in the record marked Defendant's Interrogatory Exhibit "A."

I judge from an inspection of this photograph that it is some sort of an arrangement for pushing logs on the carriage. I do not remember ever having seen a similar outfit in all these details. I have seen the old Simonson turner with the piston attached to a straight arm with a solid boss in which the shaft passed thru, but the arm that I saw and above referred to in my last answer was not attached to a straight bed-plate as shown in the photograph. Prior to my invention of the subject matter of the patent in suit I had seen the combination of a bed-plate provided at its outer end with a shaft-bearing; a shaft extending through said bearing; and an arm in operative relation with the shaft; a power cylinder pivotally mounted upon the bed-plate; and a piston rod working in the cylinder and connected at its outer end to the adjacent end of the arm, but had never such a combination in which the bed-plate was a straight bed-plate. I would regard the combination shown in this photograph—referring to Defendant's Interrogatory Exhibit "A"—as materially different from the subject matter defined in claim 12 in suit, because the bed-plate shown in this photograph has two arms extended out towards the carriage

(Deposition of Charles E. Cleveland.)

and provided with two bearings for the same, with the arm placed between the bearings, which any-one skilled in the arm would readily comprehend, is not as strong as that shown in my patent in suit.

Q. In your opinion is there any advantage in a bifurcated arm straddling a single bearing on a straight bed-plate, over a bifurcated bed-plate having two bearings upon opposite sides of an intermediate arm, other features of the construction being equal?

A. I think a bifurcated arm much stronger, because, no machine is stronger than its weakest part, and the bed-plate shown in this photograph has two members extending out from the cylinder bearing the ends of which each contain a bearing for the shaft. Now then, there is more chance for defects in the two members than there would be in one. I mean by that, casting defects. Furthermore, if one of the bearings on these members wears more than the other, and it is highly probable that they would not each wear alike, it would throw the strain on only one member, thereby springing the shaft and probably breaking that arm of the bed-plate. With a bifurcated arm, and one bearing on a straight line bed-plate, no matter how much wear or looseness there might be in this bearing the strains upon the arm and bed-plate would always be equalized. I think there would be a probability of strain of the shaft of transversed dimension such as are used in the log turners on the West coast. I think they can spring anything on the

(Deposition of Charles E. Cleveland.)

Pacific Coast. It is a big country, and big timber, but even if there should be no springs in this shaft, if one bearing wore more than the other, all of the strain would be thrown upon a single bearing, or a single member of the bed-plate. Any unequal wear upon any one bearing of the plurality of bearings which carry the shaft would occasion longitudinal disalignment of the shaft axis.

Witness handed a copy of patent number 992,212 issued May 16, 1911, to William H. Kratsch.

I do not recollect even having seen this particular machine. I never saw a hook-arm which carries the hook F as embodied in Fig. 1 of this machine.

Examination closed.

Respectfully submitted,

T. J. GEISLER,

Attorney for Plaintiff.

Approved March 27th, 1924.

Bean

_______________,

Judge.

It is hereby stipulated that the foregoing statement may be approved.

March 27, 1924.

MacCORMAC SNOW,

Of Attorneys for Defendant.

T. J. GEISLER,

Attorney for Plaintiff.

(Title.)

MEMORANDUM OPINION OF THE DISTRICT COURT.

Portland, Oregon, December 31, 1923.

Memorandum by BEAN, District Judge:

The use of a push-arm in a log-turning device, bifurcated and straddling the bearing formed upon the outer end of the bed-plate is not sufficient, in my opinion, in view of the prior art, to constitute invention and subject to patent.

Push-arms in log-turning devices were old in the art at the time of the Cleveland patent, as shown by the Simonson patents and other evidence. It is true they were straight with a single bearing on the shaft, or two such arms with a distance plate bolted between them. They were, however, for the same purpose, operated and functioned in the same way, and produced the same result as in the Cleveland patent, and in my judgment it was not invention for Cleveland to use an arm divided or forked at the lower end. It did not involve invention or patentable novelty since there is no substantial change in function, operation or result.

(Gilchrist vs. Mallory, 381 Fed. 350, and authorities there cited.)

Decree for defendant.

(Title.)

DECREE.

This cause came on to be heard at this term, and was argued by counsel; and the cause having been considered by the Court and an opinion filed therein on the 31st day of December, 1923, it is hereby ORDERED, ADJUDGED AND DECREED as follows, viz.:

That the patent, No. 933,231, dated September 7, 1909, issued to Charles E. Cleveland and by him assigned to plaintiff, is void as to the claim sued on, namely, the twelfth claim.

It is further ORDERED, ADJUDGED AND DECREED that the bill of complaint herein be and the same is hereby dismissed, and that the defendants do have and recover their costs and disbursements in this suit to be taxed by the Clerk in the sum of —— Dollars.

R. S. BEAN,
Judge.

Dated January 3d, 1924.

(Title.)

PETITION ON APPEAL.

The above-named plaintiff, D. J. Murray Manufacturing Company, a corporation, conceiving itself aggrieved by the decree entered in the above-entitled cause under date of January 3, 1924, whereby this Court did adjudge and decree that claim 12

of the letters patent of the United States granted to Charles E. Cleveland, September 7, 1909, No. 933,231, for an improvement in log-handling mechanism and assigned to the plaintiff herein, did not involve invention, and that said claim is void; said decree furthermore dismissing the bill of complaint herein with costs to the defendant.

THEREFORE, the plaintiff does hereby appeal from said decree and each and every part thereof, for the reasons set forth in the assignment of errors filed herewith, to the United States Circuit Court of Appeals for the Ninth Circuit, and prays that this appeal may be allowed and that a transcript of the record and proceedings, upon which said decree was made, duly authenticated, may be sent to said Court of Appeals, together with the exhibits in this case.

Dated March 4, 1924.

T. J. GEISLER,
Attorney for Plaintiff.

(Title.)

ASSIGNMENT OF ERRORS.

Now on this 4th day of March, 1924, comes the above-named plaintiff, D. J. Murray Manufacturing Company, a corporation, by its solicitor and counsel, T. J. Geisler, and says that the decree entered in the above-entitled cause on the 3d day of January, 1924, is erroneous and unjust to plaintiff:

I.

Because the District Court adjudged and decreed

that the improvement described and claimed in claim twelve in the letters patent of the United States granted to Charles E. Cleveland, September 7, 1909, No. 933,231, for an improvement in Log Handling Mechanism, assigned to plaintiff and sued on herein, did not involve invention and that said claim is void.

II.

Because the District Court failed and refused to adjudge and decree that said Charles E. Cleveland invented a new, useful and patentable improvement in Log Turning Mechanism duly defined and claimed in said twelfth claim of said letters patent.

III.

Because the District Court erred in not adjudging and decreeing that said claim of said letters patent is valid, that the defendant infringed the same, and that the plaintiff as the assignee of said letters patent is entitled to relief from such infringement as prayed for in the bill herein.

IV.

Because the said decree of the District Court is in prejudice of the substantial rights and equities of the plaintiff in the premises.

Dated March 4, 1924.

T. J. GEISLER,
Attorney and Counsel for Plaintiff.

(Title.)

ORDER ALLOWING APPEAL.

On motion of counsel for the above-named plaintiff, it is

ORDERED that an appeal be and hereby is allowed to the United States Circuit Court of Appeals for the Ninth Circuit, from the final decree entered in the above-entitled cause on or about the 3d day of January, 1924, dismissing the bill of complaint and it is ordered that a transcript of the record and proceedings upon which said decree was made duly authenticated and the physical exhibits submitted in said cause be sent to said Circuit Court of Appeals.

IT IS FURTHER ORDERED that the complainant file a bond to be approved by this Court in the sum of Five Hundred Dollars, to answer all costs on the appeal which may be adjudged or awarded against plaintiff if it shall fail to prosecute its appeal to effect and shall fail to make good its appeal.

Dated March 4, 1924.

R. S. BEAN,
District Judge.

(Title.)

BOND ON APPEAL.

KNOW ALL MEN BY THESE PRESENTS, that we, D. J. Murray Manufacturing Company, a corporation, having its principal office and place of

business in Wausau, Wisconsin, as principal, and Hartford Accident and Indemnity Company of Hartford, Conn., surety, are hereby held and firmly bound unto the above-named defendants in the sum of Five Hundred Dollars to be paid to the defendants or its legal representatives and for the payment of which we bind ourselves jointly and severally, firmly by these presents.

Sealed with our seals and dated this 4th day of March, 1924.

WHEREAS, the above-named plaintiff, D. J. Murray Manufacturing Company, a corporation, has appealed to the United States Circuit Court of Appeals for the Ninth Circuit, from the decree entered in the above-entitled cause Jan. 3, 1924, dismissing the bill of complaint herein.

NOW, THEREFORE, the condition of this obligation is such that if the above-named plaintiff, D. J. Murray Manufacturing Company, shall prosecute its said appeal to effect, and answer all damages and costs awarded against it, if it fails to sustain this appeal, then this obligation shall be void, otherwise to remain in full force and virtue.

D. J. MURRAY MANUFACTURING COMPANY,

Plaintiff.

By P. R. HINES,

Its Local Agent.

HARTFORD ACCIDENT AND INDEMNITY COMPANY,

By ST. JEWETT, (Corp. Seal)

Countersigned: WALKER, JEWETT & BARTON,

By ST. JEWETT,

Agents.

Signed, sealed and delivered in the presence of: As to D. J. Murray Mfg. Co., By P. R. Hines, Its Local Agent,

ARTHUR HEDEEN.

W. E. RAMSEY.

The within bond is hereby approved.

Dated Mar. 4, 1924.

R. S. BEAN,

District Judge.

Filed Mar. 4, 1924.

In the District Court of the United States, for the District of Oregon.

No. E.–8615.

D. J. MURRAY MANUFACTURING CO., a Corporation,

Plaintiff,

vs.

SUMNER IRON WORKS and SILVERTON LUMBER COMPANY, Corporations,

Defendants.

STIPULATION RE TRANSCRIPT OF RECORD.

G. H. Marsh, Esq., Clerk of the Above-named Court:

It is hereby stipulated that the transcript of record shall contain the following and that the praecipe heretofore filed may be disregarded and omitted.

In making up the transcript of appeal now pending in this cause to the United States Circuit Court of Appeals for the Ninth Circuit, please incorporate the following portions of the record:

1. The bill of complaint, omitting verification.

2. The answer, omitting verification.

3. The interrogatories propounded by the respective parties and the answers thereto, as contained in the condensed statement thereof filed by plaintiff.

3½. Stipulation dated Nov. 7, 1923, filed Nov. 10, 1923.

4. The condensed statement of the evidence as approved by the Court.

5. The opinion of the Trial Court.

6. The interlocutory decree entered January 3, 1924.

7. The petition for, and order allowing appeal.

8. The bond on appeal.

9. The assignment of errors.

10. The citation on appeal.

11. Copies of drawings and specifications of Patents Numbered 48,658; 121,355; 134,117; 309,-103; 382760; 408,760; 448,588; 448,590; 448,591;

448,592; 448,593; 483,014; 531,861; 559,192; 623,-002; 694,459; 759,857; 852,231; 875,297; 905,721; 992,212, constituting Defendant's Exhibits 1 to 20 inclusive; also U. S. Patent No. 778,522, constituting Plaintiff's Exhibit 13; also photographic reproductions of the physical exhibits identified as Plaintiff's Exhibits 16 and 17; also photographic reproductions of Defendant's Interrogatory Exhibits "A" and "B," the former being identical with Defendant's deposition, Exhibit "B"; also photographic reproduction of the model constituting Plaintiff's Exhibit 10.

And an order may be entered by the Court directing that all the original exhibits used on the trial of this cause be sent to the said Circuit Court of Appeals for its use.

Dated March 27, 1924.

T. J. GEISLER,
Attorney for Plaintiff.
MacCORMAC SNOW,
Of Attorneys for Defendants.

In the District Court of the United States, for the District of Oregon.

D. J. MURRAY MANUFACTURING CO., a Corporation,

Plaintiff,

vs.

SUMNER IRON WORKS and SILVERTON LUMBER COMPANY, Corporations,

Defendants.

STIPULATION BY PARTIES AS TO TRANSCRIPT.

It is hereby stipulated on behalf of the above-named parties that the foregoing is a true and complete transcript of record on appeal in this court, and that the Clerk of the U. S. District Court for the District of Oregon, may certify the same as such transcript without comparison thereof with the original record.

Dated Mar. 27, 1924.

T. J. GEISLER,
Counsel for Plaintiff.
MacCORMAC SNOW,
Of Counsel for Defendants.

(Title.)

CERTIFICATE OF CLERK U. S. DISTRICT COURT TO TRANSCRIPT OF RECORD.

United States of America,
District of Oregon,—ss.

I, G. H. Marsh, Clerk of the District Court of the United States for the District of Oregon, do hereby certify that the foregoing is a true and complete transcript of record on appeal, and all proceedings had in said cause in said court in the case in which D. J. Murray Manufacturing Company, a corporation, is plaintiff and appellant, and Sumner Iron Works and Silverton Lumber Company are defendants and appellees. This certificate

is made pursuant to the stipulation of the parties filed in said cause, without comparison of the transcript with the original record.

In Testimony Whereof, I have hereunto set my hand and affixed the seal of said court at Portland, in said District, this 28th day of March, 1924.

[Seal] G. H. MARSH,

Clerk.

[Endorsed]: No. 4231. United States Circuit Court of Appeals for the Ninth Circuit. D. J. Murray Manufacturing Company, a Corporation, Appellant, vs. Sumner Iron Works, a Corporation, and Silverton Lumber Company, a Corporation, Appellees. Transcript of Record. Upon Appeal from the United States District Court for the District of Oregon.

Filed March 31, 1924.

F. D. MONCKTON,

Clerk of the United States Circuit Court of Appeals for the Ninth Circuit.

By Paul P. O'Brien,

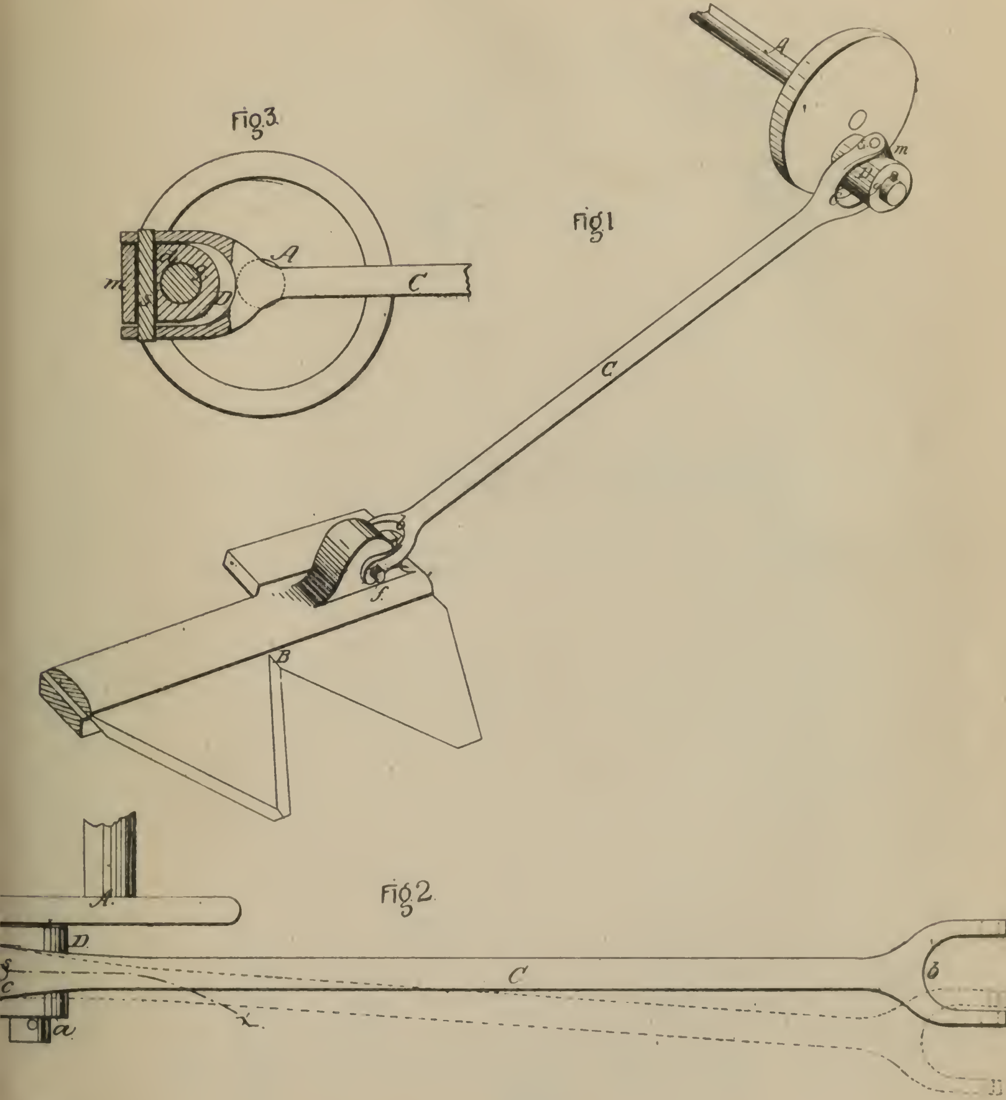
Deputy Clerk.

Sheet 1, 2 Sheets.

I. H. Coller.

Harvester Pitman.

No. 48,658. Patented Jul. 11, 1865.



Witnesses:
R. T. Campbell.
Edw. Schafer

Inventor:
Isaack H. Coller
by his Attys
Mason, Fenwick & Lawrence

I. H. Coller.

Harvester Pitman

No. 48,658. Patented Jul. 11, 1865.

Fig. 4.

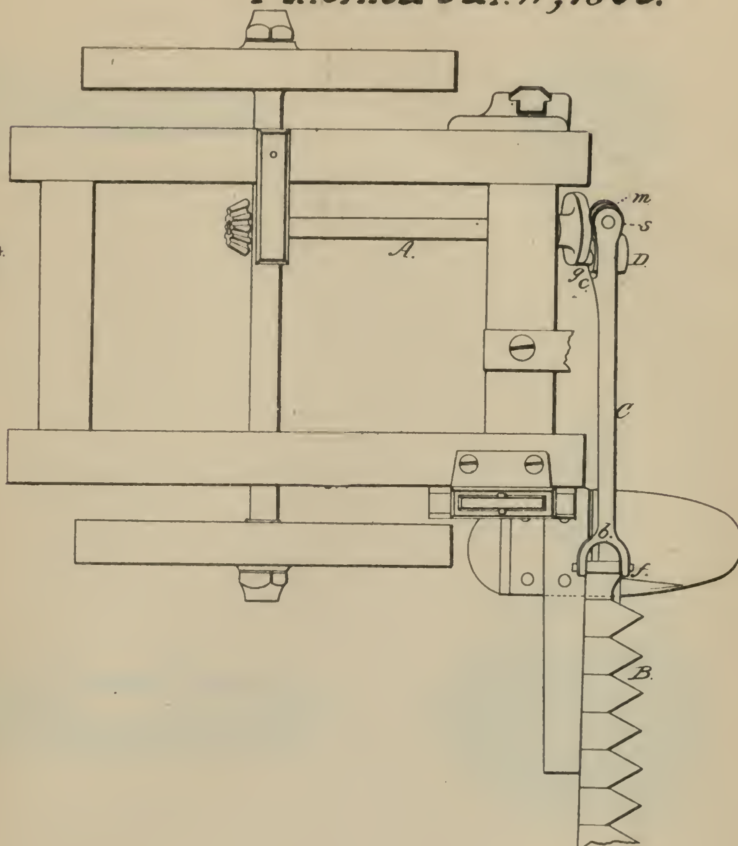
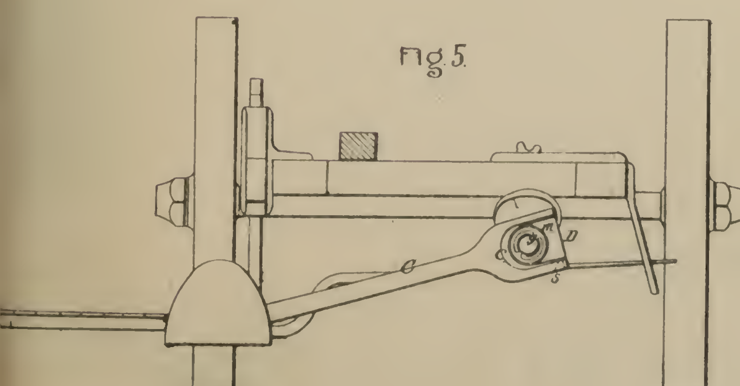


Fig. 5.



...sses

Inventor:

Isaac H. Coller
by his Attys
Mason Fenwick & Lawrence

S. WHEELER.

Pitman.

No. 134,117. Patented Dec. 17, 1872.

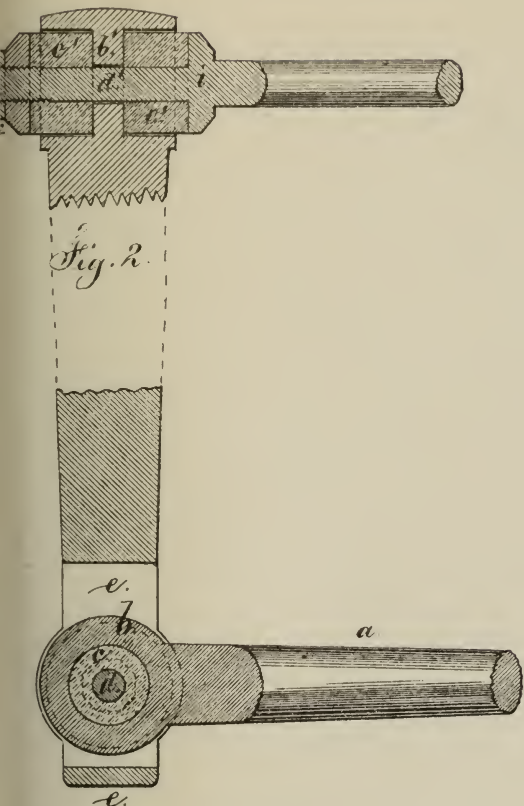


Fig. 2.

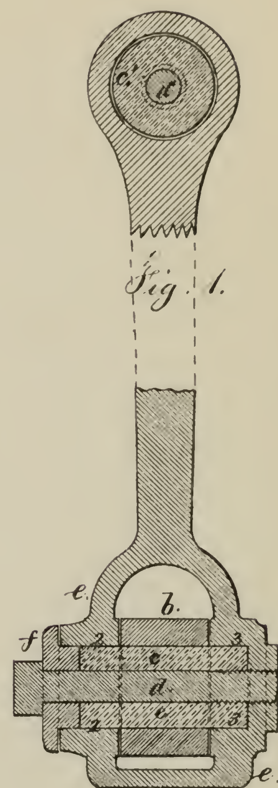


Fig. 1.

Witnesses,

Chas. H. Smith

Harold Serrell

Inventor

Seth Wheeler

Lemuel W. Serrell atty.

UNITED STATES PATENT OFFICE.

187

SETH WHEELER, OF ALBANY, NEW YORK.

IMPROVEMENT IN PITMEN.

Specification forming part of Letters Patent No. **134,117**, dated December 17, 1872.

To all whom it may concern:

Be it known that I, SETH WHEELER, of Albany, in the State of New York, have invented an Improvement in Joints or Connections for Oscillating and Reciprocating Mechanical Movements; and the following is declared to be a correct description thereof.

In sieves for winnowing-machines, separators for thrashing-machines, cutter-bars of harvesting-machines, jig-saws, and numerous other articles there is a rapid reciprocation, and the inertia of the article moved has to be overcome and the article started in the other direction. This tends to wear the joints loose of the connecting-rods, oscillating levers, or other actuating parts, and produces a violent thumping noise that is very objectionable, and the parts are rapidly impaired. Besides this, the joints in machinery of this character are often numerous and difficult to oil, and hence they frequently become heated, and there is friction, wear, and loss of power.

My invention is made for the purpose of dispensing with lubrication at the joints, for preventing looseness and wear, for increasing the motion by the inertia, and by consequence lessening the length of crank or other motor, and saving loss of power both by friction and in overcoming the inertia of the reciprocating or oscillating body, because the inertia is availed of to aid in moving the body in the opposite direction. My invention consists in a spring around the joint pin or connection of the rod or lever in an oscillating or reciprocating mechanical movement, said spring being compressed into contact with the surface of the pin and the eye surrounding the same, so that the turning motion of the joint will not be a movement of one surface upon another, but it will be torsion of the spring itself, between the inner and the outer bearing-surfaces thereof; hence this device is not adapted to the surface of a crank-pin or any joint exposed to a rotary motion, but only to such joints as have a slight turning or vibrating motion that can be allowed of in the spring itself, and the alternations of direction cause the bolt of the joint to compress the spring at first one side and then the other, throwing the greater portion of the spring to first one side and then the other, and forming an elastic cushion to the bolt and eye of the joint that necessarily overcomes the inertia of the body that is moved, and allows of a greater movement of that body than would result from rigid joints; thereby in winnowers, harvesters, separators, &c., the throw of the crank can be lessened without decreasing the movement of the reciprocating part, the noise from concussion will be stopped and the expenditure of power materially lessened, besides avoiding the use of lubricating material, and rendering the parts much more durable.

In the drawing, Figure 1 is a section of the joint pins or bolts, arms, and springs; and Fig. 2 is a section at right angles to the same.

The rod or lever *a* is made with an eye, *b*, of a size to surround the rubber spring *c*, through which the joint-pin *d* passes for the purposes aforesaid, and the jaw *e* of the other part of the joint is made with a hole through which the spring *c* is passed, as at 2, and a recess, 3, for the end of the tube *c* to enter. A cap, *f*, through which the joint-pin or bolt *d* passes, serves to confine the rubber spring and expand the same sufficiently to fill the eyes and cause the spring to adhere sufficiently to the interior of the eyes and the exterior of the pin to prevent there being a motion between the metal and the surface of the rubber tending to wear the latter, and to insure the twisting or torsion of the spring itself by the turning movement of the parts as aforesaid, and the inertia of the article moved will cause a compression of the rubber in the before-described manner and effecting the objects named.

The India-rubber spring might be replaced by a wire helix having a corresponding action.

Where the reciprocation is in a different direction, I make the spring in two parts, as at c', the ends being confined against the central division b', and the joint-pin d' having the shoulder *i*, cap and nut *f* to regulate the pressure upon the springs. In this construction the rod or joint-pin d' is free to play slightly endwise, or to turn partially around, or to vibrate laterally, because the springs c' are not confined by the portion of the eye that surrounds them; but there will not be any sliding of one surface upon the other, the motion being allowed for by the springs.

I claim as my invention—

The jaw *e*, with an eye, 2, and socket 3 for the rubber tube *c*, in combination with the clamping-washer or cap *f*, pin *d* and eye *b*, or their equivalents, substantially as set forth.

Signed by me this 26th day of April, A. D. 1872.

SETH WHEELER.

Witnesses:

STAATS WINNE,

JAMES C. WENDREM.

(No Model.) 2 Sheets—Sheet 1.

F. F. SCHOFIELD.

LOG LOADER.

No. 309,103. Patented Dec. 9, 1884.

Fig 1.

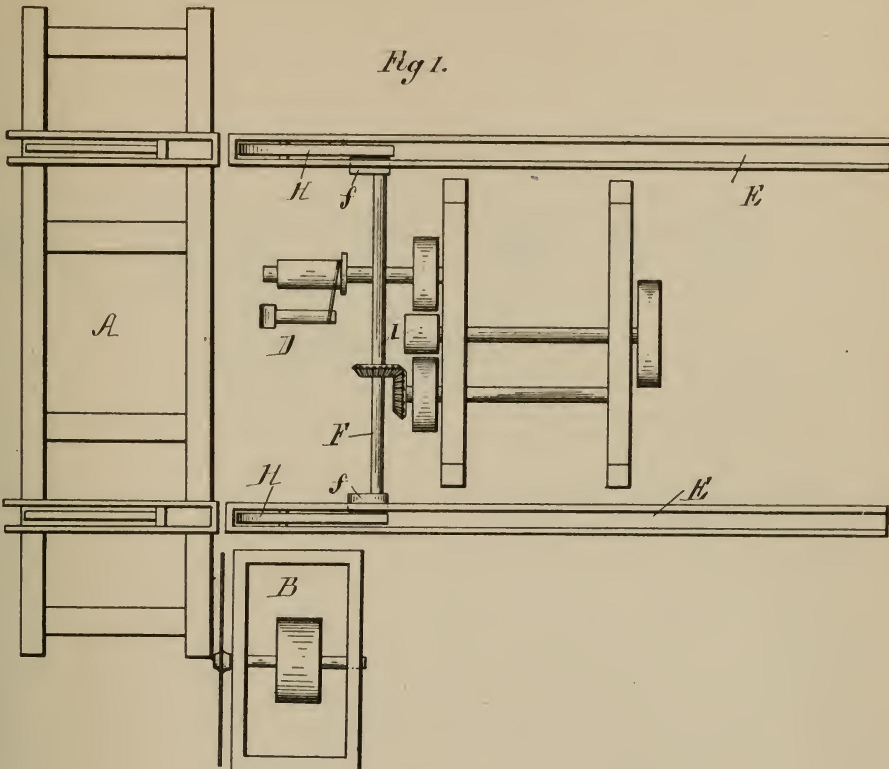
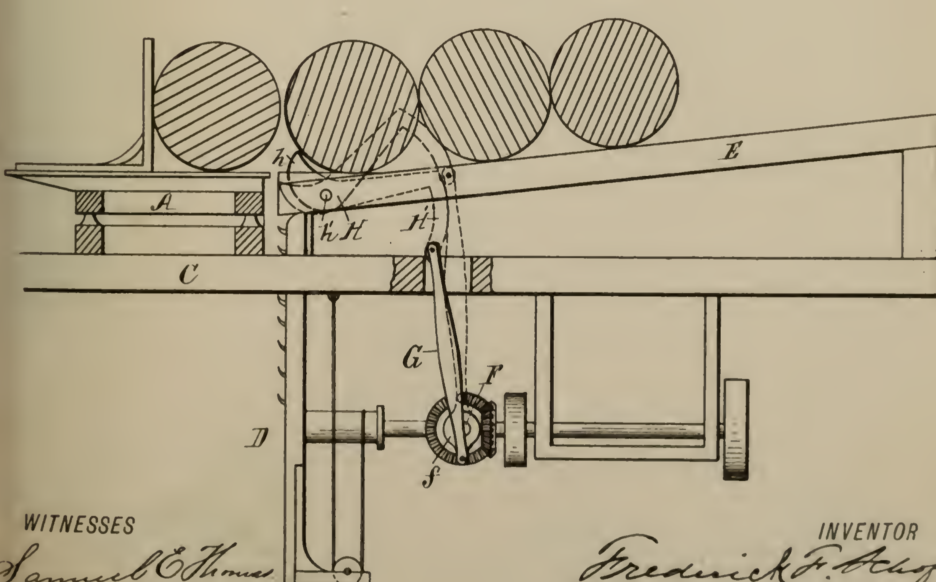


Fig 2.



WITNESSES

Samuel E. Thomas

N. S. Wright.

INVENTOR

Frederick F. Schofield

By W. W. Leggett

Attorney

It is hereby certified that the residence of the patentee of Letters Patent No. 309,103, granted December 9, 1884, upon the application of Frederick F. Schofield, for an improvement in "Log-Loaders," was erroneously written and printed "Ascoda;" that said residence should have been written and printed *Oscoda;* and that the proper corrections have been made in the files and records pertaining to the case in the Patent Office, and should be read in the Letters Patent to make it conform thereto.

Signed, countersigned, and sealed this 23d day of December, A. D. 1884.

[SEAL.]

M. L. JOSLYN,
Acting Secretary of the Interior.

Countersigned:

BENJ. BUTTERWORTH,
Commissioner of Patents.

UNITED STATES PATENT OFFICE.

FREDERICK F. SCHOFIELD, OF ASCODA, MICHIGAN.

LOG-LOADER.

SPECIFICATION forming part of Letters Patent No. 309,103, dated December 9, 1884.

Application filed May 29, 1883. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK F. SCHOFIELD, of Ascoda, county of Iosco, State of Michigan, have invented a new and useful Improvement in Log-Loaders; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form a part of this specification.

My invention consists in the combinations of devices and appliances hereinafter specified, and more particularly pointed out in the claims.

In the drawings, Figure 1 is a plan view of an apparatus embodying my invention. Fig. 2 is a side elevation. Fig. 3 is an end elevation of a portion of the same. Fig. 4 is a separate view of one of the parts.

The object of my invention is to provide an improved log-loader, adapted to load logs onto a carriage commonly employed in saw-mills, which shall be capable of ready and easy operation.

I accomplish my object as follows:

As illustrated in the drawings, A represents the ordinary carriage.

B represents the frame in which the circular saw is engaged.

C represents the floor.

D represents the "nigger."

E is the skidway of my improved loader.

F is an operating shaft or roller beneath the floor, said shaft or roller adapted to be driven by friction or other means.

f represents a crank or eccentric at the ends of the operating-shaft.

G represents connecting-bars secured to said cranks or eccentrics at their lower extremities.

H represents a cant lever or bar of suitable form, preferably constructed as shown in Fig. 4, having a toe-piece, *h*, and an angular arm, H′, the extremity of said arm being hinged or pivoted to the upper extremity of the connecting-rod. The cant-lever is pivoted in the skidway, as shown at *h*′, in such a manner that the toe of the lever may be tilted downward upon or below the level of the surface of the skidway, in which position the angular arm will be projected above the surface of the skidway, as shown in dotted lines in Fig. 2.

It is evident that when the toe of the lever projects and the angular arm is depressed to the level of the surface of the skidway the toe-pieces will hold the log in place; but when the operating shaft or roller is rotated, so that the toe is depressed and the angular arm elevated, the log resting upon the cant-lever and held in place by the toe-pieces will be projected downward upon the circular carriage. The length of the cant-lever is such that as one log is projected forward off the skidway the angular arm will be projected between it and the following log in such a manner that but one log will be loaded upon the carriage at a time. The continued rotation of the operating-shaft will again depress the angular arm and elevate the toe of the cant-lever, thus letting the log forward upon the face of the cant-levers, where it will again be held in place by the elevated toes.

The skidway is preferably constructed of two timbers on each side, so that the cant-lever can be pivoted between them, though said levers may be pivoted to the skidway in any suitable manner.

The friction of the roller I, by which the operating-shaft is rotated, may be controlled in any proper manner—as, for instance, by the lever I′—and said friction-roller may also operate the nigger in any ordinary manner.

What I claim is—

1. In device for rolling logs from a skid to a saw-carriage, a series of rocking arms mounted on a transverse shaft connected to said skid, in combination with a pulley rotatable at will, and a rod connecting the pulley to at least one of said rocking arms, substantially as set forth.

2. The combination, with the skidways E and log-carriage A, of the cant-levers H, pivoted to rock in a vertical plane, and each constructed at one end with the toe-piece *h*, and at the other end with a depending angle-arm, H′, the rods G, pivoted at one end to the said angle-arms, and the shaft F, having crank-arms *f* pivoted to the lower ends of the rods, substantially as described.

3. The combination, with the skidways E and log-carriage A, of the cant-levers H, di-

rectly pivoted on the skidways, and each having at one end the toe-piece h, and at the other end the depending angle-arm H′, the rods G, pivoted at one end to the depending angle-arms, and the shaft F, having crank-arms f pivoted to the other end of the said rods, substantially as described.

4. The combination, with the skidway E and log-carriage A, of the cant-levers H, pivoted directly to the skidway on independent pivots, and each provided with a toe-piece, h, and a depending angle-arm, H′, and devices connected with said levers to rock them in a vertical plane, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

FREDERICK F. SCHOFIELD.

Witnesses:

N. S. Wright,
Samuel E. Thomas.

Defts' Ex. 5.

(No Model.)

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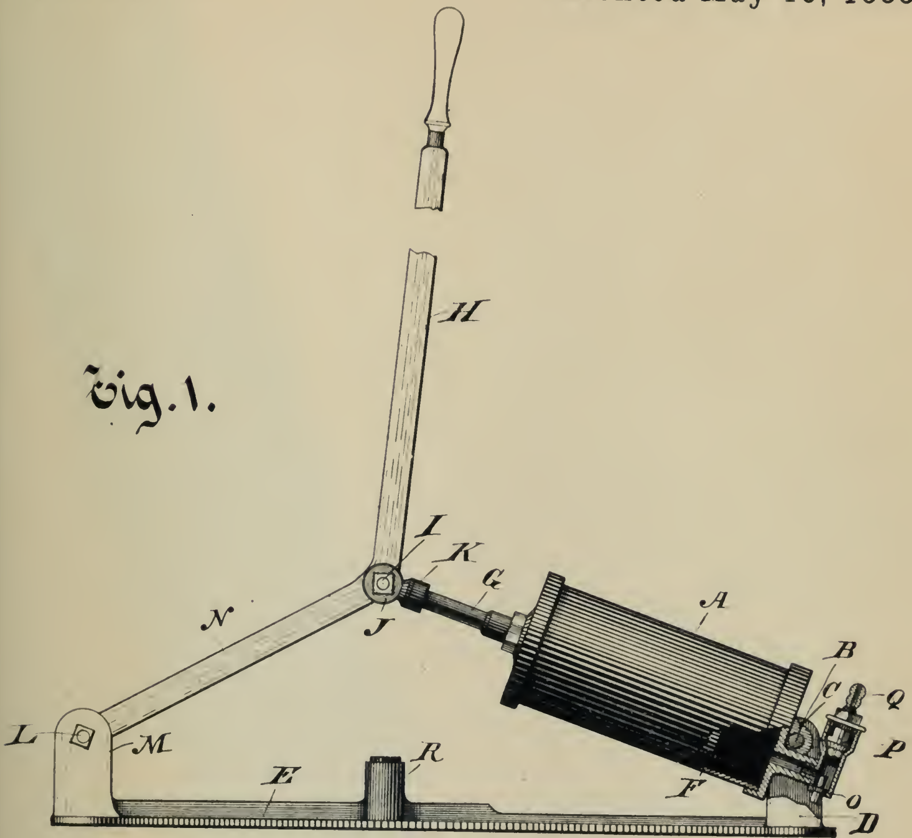
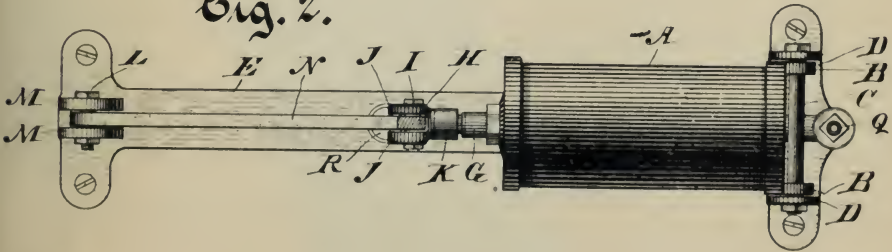
J. B. ERWIN.

AIR COMPRESSOR.

No. 382,760. Patented May 15, 1888.





Witnesses:

C. H. Keeney.

Anna Faust.

Inventor:

James B. Erwin

UNITED STATES PATENT OFFICE.

JAMES B. ERWIN, OF MILWAUKEE, WISCONSIN.

AIR-COMPRESSOR.

SPECIFICATION forming part of Letters Patent No. 382,760, dated May 15, 1888.

Application filed November 1, 1887. Serial No. 253,977. (No model.)

To all whom it may concern:

Be it known that I, JAMES B. ERWIN, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Air-Compressors; and I do hereby declare the following to be a full, clear, and exact description of said invention, reference being had to the accompanying drawings, and to the letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in air-compressors; and it pertains to that class in which the air compressing piston is operated by a lever.

It is a well-known fact that when forcing air into a receiver at a high pressure the first part of the downward stroke of the piston against the air is comparatively easy, and that the resistance of the compressed air to the piston gradually increases in the same ratio that the density of the air is increased, and it consequently follows that with an air-compressor of the ordinary construction the power required at the last of the stroke is much greater than that required at the first.

The object of my improvement is to provide a device by which the power of the lever is increased as the resistance of the compressed air to the piston is increased, whereby the last of the stroke of the lever is made with as great ease as the first, and the resistance to the lever is nearly uniform throughout the entire stroke.

The construction of my invention is explained by reference to the accompanying drawings, in which—

Figure 1 represents a side view of my air-compressor, part in section; and Fig 2 represents a top view thereof.

Like parts are represented by the same reference-letters in both views.

A is an oscillating cylinder, which is pivoted at its lower end by lugs B B and pivotal bolt C to the lugs D D of the base or bracket E.

F is a piston of the ordinary construction.

G is the piston-rod. The rod G is pivoted to the operating-lever H by the pivotal bolt I, which bolt I passes through the lugs J J, formed on the sleeve K. Sleeve K is affixed to the end of the piston-rod G. The lower end of the lever H is pivoted to the bracket or base E by pivotal bolt L, passing through the upward-projecting lugs M M. The upper end of the lever H is inclined at such angle to its short arm N as is most convenient to be operated, or as may be preferred by the operator. By this arrangement it is obvious that when the lever H is moving forward during the first of the stroke from the position above the pivotal bolt L the piston F is moved forward or downward in the cylinder with a more rapid movement corresponding with the forward movement of the lever H, which movement of the piston gradually diminishes as the arm N approaches the horizontal in line with the oscillating cylinder, and at the last of the stroke the piston moves forward but slowly, and consequently the power of the operator over the resistance is increased in the same ratio that the forward movement of the piston is diminished. With the upstroke of the piston air enters the cylinder through the check-valve O, which is raised by the current of air in entering. With the return or downward stroke of the piston the check-valve O closes and the air is forced out above it through the check-valve P, and from thence through the nozzle Q to the air-receiver, with which the nozzle Q is connected by a flexible tube. The downward stroke of the lever H is arrested as the piston reaches the lower end of the cylinder A by contact with the stop R, which stop is affixed to or formed in connection with the base or bracket E. It is obvious that by thus pivoting the cylinder, piston-rod, and operating-lever, as shown, a so-called "toggle-joint lever" is formed, by which, as the short arm of the operating-lever and the piston-rod are brought in line with each other between their respective supporting-pivots at each downward movement of the piston, the piston is thereby caused to move with an accelerating and almost irresistible force at that part of its stroke where the resistance to its movement is greatest and where the greatest force is required.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an air-compressor, the combination of an oscillating cylinder pivoted at a fixed point to a supporting-bracket and provided with inlet and outlet air-controlling valves, a pis-

ton and a piston-rod, a two-armed lever pivoted at one end to the cylinder-supporting bracket, and at an intermediate point between its ends to the protruding end of said piston-rod, the pivotal point of said rod and lever being adapted with each downward stroke of the piston to be brought in line with the fixed pivotal points of said lever and cylinder, substantially as and for the purpose specified.

2. In an air compressor, the combination of the base or bracket E, provided at its respective ends with upward-projecting lugs D D and M M, and at or near its center with a stop, R, air-compressing cylinder A, provided with air-controlling valves O and P, piston F, and piston-rod G, pivotal lugs B B, affixed to the lower end of said cylinder and pivoted to said lugs D D by pivotal bolt C, pivotal bolt C, and operating-lever H, pivoted at its lower end to said lugs M M and at an intermediate point between its ends to the protruding end of said piston-rod G, all substantially as and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES B. ERWIN.

Witnesses:
C. T. BENEDICT,
C. H. KEENEY.

Defts' Ex. 5 1/2

Model.)

F. SIMONSON.

LOG LIFTING AND TURNING MACHINE.

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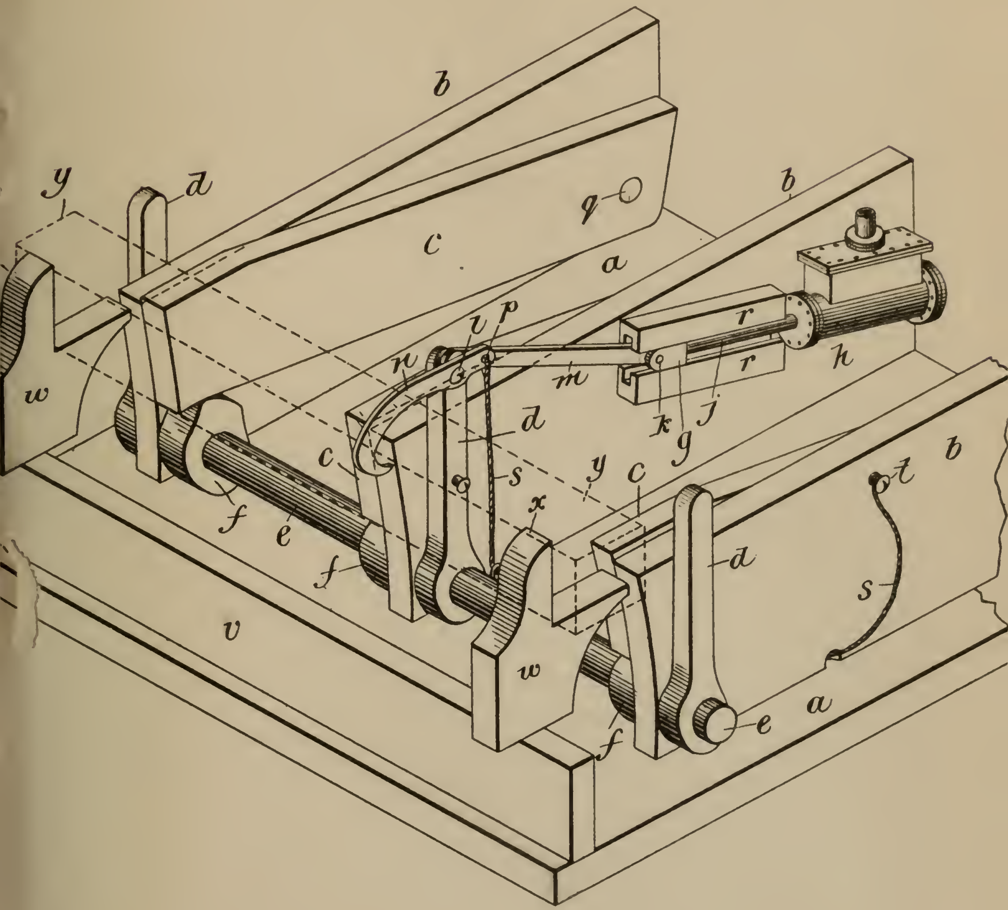
. 408,760. Patented Aug. 13, 1889.



itnesses:
James P. Gay
P. F. Teter

Inventor.
Flavel Simonson

United States Patent Office.

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FLAVEL SIMONSON, OF BATESVILLE, ARKANSAS.

LOG LIFTING AND TURNING MACHINE.

SPECIFICATION forming part of Letters Patent No. 408,760, dated August 13, 1889.

Application filed December 17, 1888. Serial No. 293,929. (No model.)

To all whom it may concern:

Be it known that I, FLAVEL SIMONSON, a citizen of the United States, residing at Batesville, in the county of Independence and State of Arkansas, have invented a new and useful Log-Lifting and Log-Turning Machine, of which the following is a specification.

The object of my invention is, first, to put a log onto the carriage of a saw-mill; second, to turn the log over or partly over while being sawed; third, to slide a square stick or partly square stick onto the carriage after having been turned. I attain these objects by the mechanism illustrated in the accompanying drawing, in which drawing I have shown a perspective view of my invention.

Similar letters refer to similar parts throughout the drawing.

a is the mill-floor; *b*, logways; *c*, log-lifters; *e*, shaft on which arms *d* and eccentrics *f*, that raise log-lifters *c*, are fastened; *q*, pins on which log-lifters *c c c* swing; *t*, pin on side of logways *b*, to which rope *s* is attached; *n*, hook to turn log *y*; *l*, bolt on which hook *n* swings, and which also receives pitman *m*; *p*, hole in hook *n* to attach rope *s*; *m*, pitman of engine *h*; *k*, pin in cross-head *g*; *r r*, guides; *j*, piston-rod of engine *h*; *v*, carriage of saw-mill; *w w*, head-blocks; *x x*, knees of head-blocks; *y y*, log.

Operation: To turn a log, apply steam to the upper end of the engine *h*, which will draw down the arm *d*, carrying the hook *n*, and the hook *n* will pull the log *y* forward until it strikes the log-lifters *c*, and the hook *n* will roll the log *y* forward onto the log-lifters *c*. Then apply steam to the lower end of the engine *h*, and the arms *d* will push the log *y* onto the head-blocks *w* and against the knees *x*. It will be noticed that when the log *y y* is turned forward onto the log-lifters *c* they are raised by the eccentrics *f* above the head-blocks *w*, which admits of the log *y* being shoved back onto the head-blocks *w*. When the log *y* has been turned and shoved back, pull on the rope *s* where it is attached to pin *t* and the hook *n* will be raised so as to clear the log *y y*. Then apply steam to the upper end of the engine *h*, and the arms *d* will be drawn down below the logways *b* and the hook *n* will drop by the side of its arm *d*, and this arm *d* being fastened to the shaft and the other arms being also fastened to the shaft *e* the arms *d* are all drawn below the top of the logways *b*, and the eccentrics *f* being also fast to shaft *e* they are carried back when the shaft *e* turns, causing the log-lifters *c* to also recede by gravitation below the top of the logways *b*. When all the arms *d* and the log-lifters *c* are drawn below the logways *b*, another round log can be rolled over them to a point between where the end of the arms *d* will rise above the top of the logways *b* and head-blocks *w*. To put this round log onto the head-blocks *w*, apply steam to the lower end of the engine *h*, and the arm *d* rising will turn the shaft *e*, which will cause the eccentrics *f* to raise the log-lifters *c* above the top of the logways *b*, carrying the log *y* above the head-blocks *w*, so that the arms *d* can either push or roll the log *y* onto the head-blocks *w*. If it is desired to turn a log and the arms *d* are at rest below the top of the logways *b* and the hook *n* hanging down, first pull on the rope *s* at *t*, and the hook *n* will be raised into the air, so as to clear the log *y*. Then apply steam to the lower end of engine, and the hook *n* will be thrown over the log *y*, and the eccentrics *f* will raise the log-lifters *c*, so as to catch the log *y* as it slides forward and make it turn by the pulling of the hook *n*, as heretofore described.

What I claim, and desire to secure by Letters Patent, is—

1. In a machine for turning and lifting logs, the combination, with an engine, a rock-shaft, an arm secured to the shaft, a hook pivoted to the free end of the arm, a pitman-rod pivotally connecting the hook with the piston-rod of the engine, and guides *r*, for regulating the direction of movement of the piston-rod, substantially as and for the purpose specified.

2. The combination, in a log lifting and turning machine, of a log-lifter *c*, a rock-shaft *e*, an eccentric *f*, fastened on the shaft for raising the log-lifter, a straight arm *d* on the shaft, and the engine *h*, connected with the arm, substantially as and for the purpose specified.

FLAVEL SIMONSON.

Witnesses:
JAMES P. GAY,
P. F. TETER.

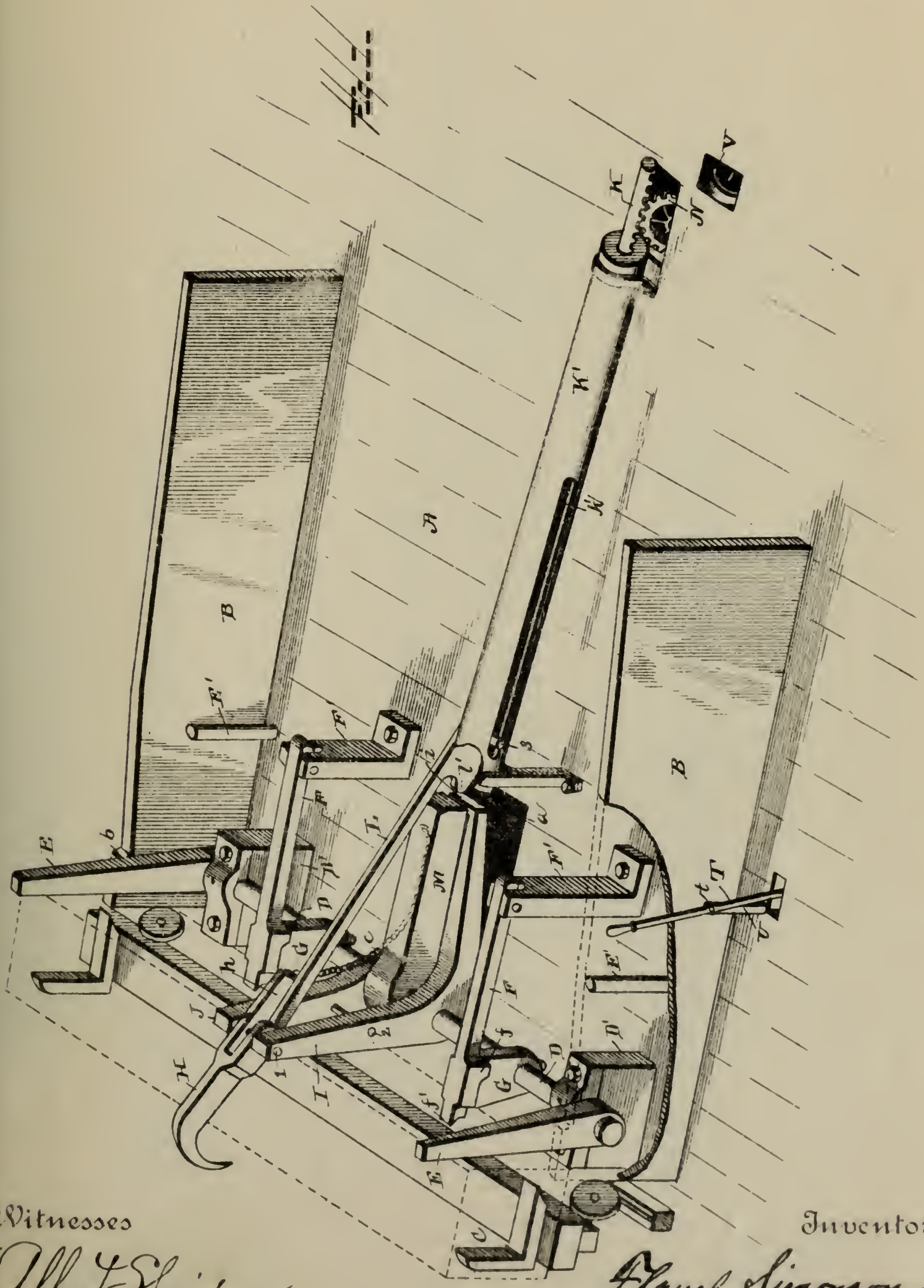
(No Model.) 197

3 Sheets—Sheet 1.

F. SIMONSON.

LOG LIFTING AND TURNING MACHINE.

No. 448,588. Patented Mar. 17, 1891.



Witnesses

Albert Speiden,

B. H. Naylor

Inventor

Flavel Simonson

By his Attorney

Wm. Hunter Myers.

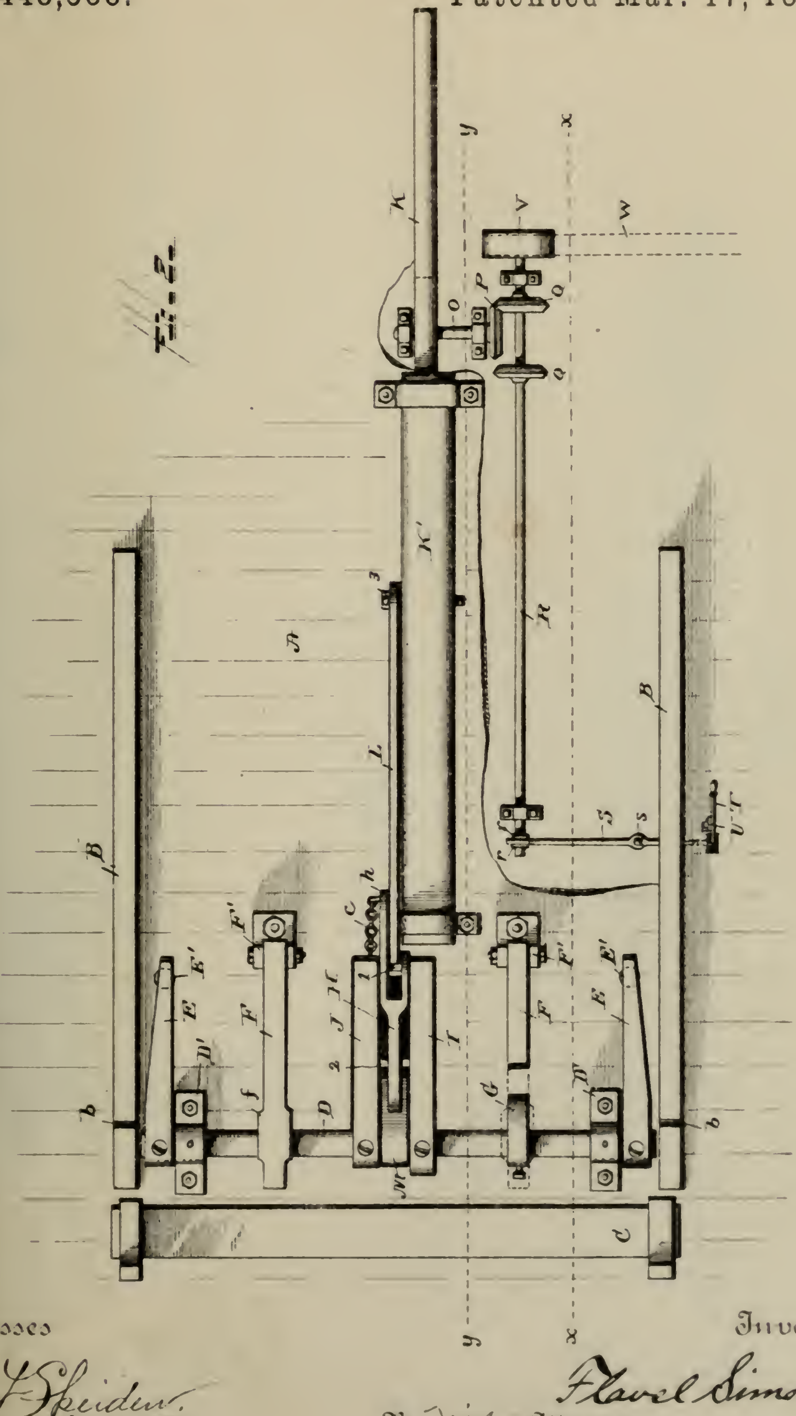
Model.) 3 Sheets—Sheet 2.

F. SIMONSON.

LOG LIFTING AND TURNING MACHINE.

o. 448,588. Patented Mar. 17, 1891.

Fig. 2.



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ert Speiden.

H. Naylor

Inventor

Flavel Simonson

By his Attorney,

Wm Hunter Myers

UNITED STATES PATENT OFFICE.

FLAVEL SIMONSON, OF BATESVILLE, ARKANSAS, ASSIGNOR TO GEORGE H. CHAMBERLAIN, OF MILWAUKEE, WISCONSIN.

LOG LIFTING AND TURNING MACHINE.

SPECIFICATION forming part of Letters Patent No. 448,588, dated March 17, 1891.

Application filed October 16, 1889. Serial No. 327,168. (No model.)

To all whom it may concern:

Be it known that I, FLAVEL SIMONSON, a citizen of the United States of America, residing at Batesville, in the county of Independence and State of Arkansas, have invented an Improved Log Lifting and Turning Machine, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to an improved log lifting and turning machine; and it has for its object the production of a machine whereby the log may be lifted from the logways, pushed onto the saw-mill carriage, and drawn clear of the carriage in the operation of turning it, the cant-hook operating automatically to engage with the log or to pass clear of it at pleasure.

The invention will first be described in connection with the accompanying drawings, and then pointed out in the claims.

Figure 1 of the drawings is a perspective view of the machine with the parts in position for turning the log, one of the logways being partly broken away. Fig. 2 is a plan view of the machine at rest, a portion of the floor of the mill being broken away to show the mechanism that reciprocates the operating-bar. Fig. 3 is a longitudinal section of the machine at rest, taken on the line x x of Fig. 2. Fig. 4 is a longitudinal section of the machine in the position shown in Fig. 1, taken on the line y y of Fig. 2. Fig. 5 is a detail view, partly in section, of the hook-weight, showing the manner of its attachment to the rock-shaft.

Referring to the accompanying drawings, A represents the floor of the mill, on which the machine is set.

B are the logways, constructed in the usual manner, each having an abutment at b, against which the log rests when the machine is not in operation.

C is the head-block of the log-carrier, which is slightly elevated above the plane of the forward ends of the logways for an obvious purpose.

D is a rock-shaft journaled in pillow-blocks D′ between the logways.

E are pushing-arms, one of which is secured on each end of the rock-shaft outside of the pillow-block, and E′ are standards for supporting these arms when the machine is at rest.

F are the log-lifters, two or more, each pivoted at its rear end to a standard F′, secured to the floor, its forward free end resting on a cam G, secured to the rock-shaft in such position that the lifter will be in its lowest position when the machine is at rest, as will be seen in Fig. 3, the lifter being provided with flanges f for holding it on the cam. The upper edge of the front end of each lifter is beveled off to a sharp point, as at f', for a purpose which will hereinafter appear.

In Patent No. 408,760, granted to me August 13, 1889, the log-lifters are shown and described as pivoted at their rear ends to the logways, these lifters being made of wooden planks. That arrangement of the log-lifters has been found to be objectionable for the reason that bark and splinters of wood frequently get between them and the logways and prevent their free action. By mounting the lifters on standards away from and independent of the logways I avoid this objection, which is a serious matter when the rapidity with which the machine is required to be worked is taken into consideration.

H represents the hook, whose pivotal end is bifurcated, one branch h of this bifurcated portion being considerably longer than the other, as clearly shown in Figs. 1, 2, and 4.

The hook H is pivoted between two supporting-arms I J, rigidly secured on the rock-shaft, the pivot-bolt 1 passing through the bifurcated part of the hook, for a purpose explained hereinafter. Another bolt 2 passes through the arms I J below the hook, which prevents the latter from falling too low when the machine is at rest, as seen in Fig. 2.

K represents a reciprocating operating-bar, working in any suitable housing K′, and L is a pitman, one end of which is pivoted on a bolt 3, passed transversely through the forward end of bar K and through the housing K′, the latter being slotted, as at k', to permit of the reciprocation of said bolt. This housing, however, is not considered an essential element of my machine, as any other convenient

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means for guiding the operating-bar may be employed. The forward end of the pitman is pivoted on a bolt 4 in the bifurcated portion of the hook below bolt 1, on which the hook is pivoted, as seen in Fig. 4.

For the purpose of holding the hook in an elevated position, so as to clear the log after the latter has been pushed to its place on the head-block, I employ what I term a "hook-weight" M, which is a bar of metal having a slot m in one end and provided with a fixed radial pin m', which extends a short distance into the slot. The hook-weight is loosely mounted on the rock-shaft between the arms I J, and, by reason of its slot, is capable of a slight longitudinal movement thereon, so that the pin m' may engage with or be disengaged from a shallow radial hole d in the rock-shaft, as clearly shown in Fig. 5. A chain c connects the free end of the weight with the rear end of branch h of the hook.

One of the hook-supporting arms I is made in the form of a bell-crank, the rear arm of which has a lateral projection i, serving as a support for the free end of the weight M at such time as the hook is to engage with the log, as seen in Fig. 1, the projection itself being shown also in Fig. 5.

The rear end of the pitman L has a shoulder l, which abuts against the rear arm of the bell-crank I when the rock-shaft has been turned sufficient to cause the pushing-arms E to place the log in its proper position upon the head-block, and thus prevents these arms from further crowding the log, and immediately above this shoulder the pitman has an integral finger l', which serves to push the weight M forward, and thus cause it to drop off from its support i, which results in its holding the hook elevated, it being understood that the floor of the mill is cut out, as at a, to permit the downward swing of both the weight and the bell-crank I.

Any convenient and effective means may be employed to reciprocate the operating-bar K, the mechanism shown serving the purpose very well. In this case the bar has teeth formed on its under side, into which mesh the teeth of a gear-wheel N, mounted on a short transverse shaft O, suitably journaled beneath the floor, the said shaft carrying also a beveled friction-wheel P, with which two other beveled friction-wheels Q engage alternately. These wheels Q are keyed on a longitudinal shaft R, supported beneath the floor in a manner to permit of its movement longitudinally, so as to put either one of the wheels Q into engagement with wheel P, according to the direction in which the operating-bar is to be moved. This movement is imparted to the shaft R by means of a lever S, pivoted horizontally beneath the floor, as at s, to whose outer end is secured one end of a vertical lever T, which extends upward through the floor and is pivoted at t to a standard U, the inner end of the lever S loosely embracing the shaft R between collars r r thereon. Shaft R is provided with a band-pulley V, over which passes a belt W, (shown in dotted lines in Fig. 2,) leading from any suitable motor.

The operation of my machine is as follows: Assuming that there is a log on the logways resting against the abutments b and on the log-lifters F, then when it is desired to place the log upon the carriage the operator throws lever T in the direction to put the friction-wheels into gear to drive the operating-bar forward. This movement of that bar through the pitman and arms I J turns the rock-shaft forward, when the cams G will raise the log-lifters and the log thereon to a plane slightly above that of the carriage. By this time the pushing-arms E and also the hook-supporting arms I J will bear against the log and as the rock-shaft continues to turn, these arms will push the log forward until it reaches its proper place upon the head-block, by which time the shoulder l on the pitman will have come into contact with the rear end of the bell-crank I, as before stated, and arrest any further forward turning of the rock-shaft, and consequently of the pushing-arms. The hook will of course be prevented from rising so long as its supporting-arms are against the log. The log being now on the head-block, the operator reverses the motion of the operating-bar, which results in drawing down the hook-supporting arms, thus turning the rock-shaft and lowering the log-lifters and the pushing-arms. Now when the operator desires to turn the log, he again causes the operating-bar to move forward, when the pitman will throw the hook up. It will be understood that the pitman is pivoted to the hook below the pivotal point of the hook in its arms. The hook-weight M now rests on its support i, thus leaving its chain slack, in order that the hook may be canted forward at the proper time to engage with the log. In this operation the operating-bar is not allowed to make quite a full forward movement in order that the hook-weight may not be pushed off of its support by the finger l' on the pitman, but it does move forward far enough to permit the hook to drop over the log. Then the operator again reverses the movement of the operating-bar to swing the hook down onto the log, and as the said bar continues to recede the log is drawn partially off of the head-block and against the sharp ends f' of the log-lifters. Then as the hook swings in the arc of a circle the log is turned, and meanwhile drawn clear of the head-block and onto the logways. The sharp ends of the lifters serve a very useful purpose in that they will not permit the log to slip, no matter what its condition may be, whether without bark or having thin, thick, or loose bark. This would not be the case were the ends of the log-lifters blunt, for then the log would be very apt to slip if it were without bark or

having loose bark. The log now having been turned, the operator again causes the operating-bar to move forward to push the log back onto the head-block again, in the manner before described. The free end of the hook-weight now rests on its support i, with its pin m' in the hole d in the rock-shaft, and as the operating-rod is given its full forward throw the finger l' on the pitman strikes against the end of the weight and pushes it off from its support, the slot m permitting this movement. As the hook-weight is thus pushed forward, of course its pin m' will be thrown out of the hole d in the rock-shaft, and then when the weight drops the pin will be carried around onto the circumference of the shaft. The weight being now in its lowered position the rear end of the hook will be drawn down, thus throwing the hook portion up out of the way of the log and permitting the pushing-arms to replace the log upon the head-block. The hook is prevented from turning over backward under the influence of the weight by reason of its pivot-bolt 1 coming into contact with the upper edge of the pitman. When the machine is brought to rest, the rock-shaft will be in position to permit the pin m' to again drop into the hole d, thus lowering the weight until its lower end passes beyond the support i on the bell-crank I, so that when the machine is again started the bell-crank will carry the weight up with it.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the logways, of a rock-shaft suitably mounted between said logways at their forward ends, cams secured on said shaft, standards placed between but independent of the logways, and lifting-levers whose rear ends are pivoted in said standards and whose forward ends rest on the cams, substantially as described.

2. The combination, with the logways, of a rock-shaft suitably mounted between said logways at their forward ends, cams secured on said shaft, and log-lifters, each having a sharp projection on its front end, the forward ends of said lifters resting on the cams and their rear ends pivoted on any suitable support, for the purposes stated.

3. The combination, with the rock-shaft, of the hook, a support on which the hook is pivoted secured to said shaft, an operating-bar, and a pitman, the rear end of the latter being pivoted to the operating-bar and its forward end pivoted to the hook below the point at which the hook is pivoted to its support, whereby in the movements of the operating-bar the hook is automatically raised and lowered and the shaft rocked, substantially as described.

4. The combination, with the logways, of a rock-shaft between them, pushing-arms secured to said shaft, cams also secured to the shaft, log-lifters pivoted at their rear ends to suitable supports, their forward ends resting on said cams, a hook pivoted on a support secured to the rock-shaft, and mechanism for rocking the shaft, the hook being automatically raised and lowered by the mechanism that rocks the shaft to raise the lifters and throw the pushing-arms forward.

5. The combination, with the rock-shaft, of a hook having a bifurcated shank, two arms secured to the shaft between which the hook is pivoted by a bolt passing through its bifurcated portion and into said arms, a reciprocating operating-bar, and a pitman, the rear end of the latter pivoted to said bar and its forward end pivoted in the bifurcation of the hook below the bolt on which the hook is pivoted, whereby in the forward movement of the operating-bar the hook is raised and prevented from falling backward and the shaft rocked, substantially as described.

6. The combination, with the rock-shaft and the pushing-arms secured thereon, of a bell-crank secured to the shaft, a hook pivoted on the bell-crank, an operating-bar, and a pitman pivoted to said bar and to the hook, the pitman having a shoulder which engages with the bell-crank to limit the forward rocking of the shaft, whereby the pushing-arms are prevented from pressing against the log after the latter has been pushed to its place on the head-block, substantially as described.

7. In a log lifting and turning machine, the combination of a rock-shaft, a hook pivoted on a support secured to said shaft, mechanism for rocking the shaft and canting the hook, and an automatically-actuated device for holding the hook elevated at the will of the operator, for the purposes stated.

8. In a log lifting and turning machine, the combination of a rock-shaft, a hook pivoted on a support secured to said shaft, mechanism for rocking the shaft and canting the hook, and an automatically-actuated weight connected to the hook for holding the latter elevated at the will of the operator.

9. In a log lifting and turning machine, the combination of a rock-shaft, a hook pivoted to a support secured to said shaft, mechanism for rocking the shaft and canting the hook, a weight hung at one end upon the rock-shaft, its other end resting normally upon a suitable support and connected to the hook, and means for automatically dropping the weight to hold the hook elevated at the will of the operator, for the purposes stated.

10. The combination, with the rock-shaft having a shallow hole serving as a pin-seat, of a bell-crank secured to the shaft and having a lateral projection on its rear arm for the support of the free end of the hook-weight, a hook pivoted on the bell-crank, a hook-weight having an elongated opening through one end, which end is placed over the rock-shaft next to the bell-crank, and also having a radial pin extending into said opening in position to register at the proper

time with the pin-seat in the rock-shaft, a chain connecting the free end of said weight with the shank of the hook, an operating-bar, and a pitman pivoted to said bar and to the hook, the pitman being provided with a finger for pushing the hook-weight off from its support when the hook is to be held in an elevated position, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FLAVEL SIMONSON.

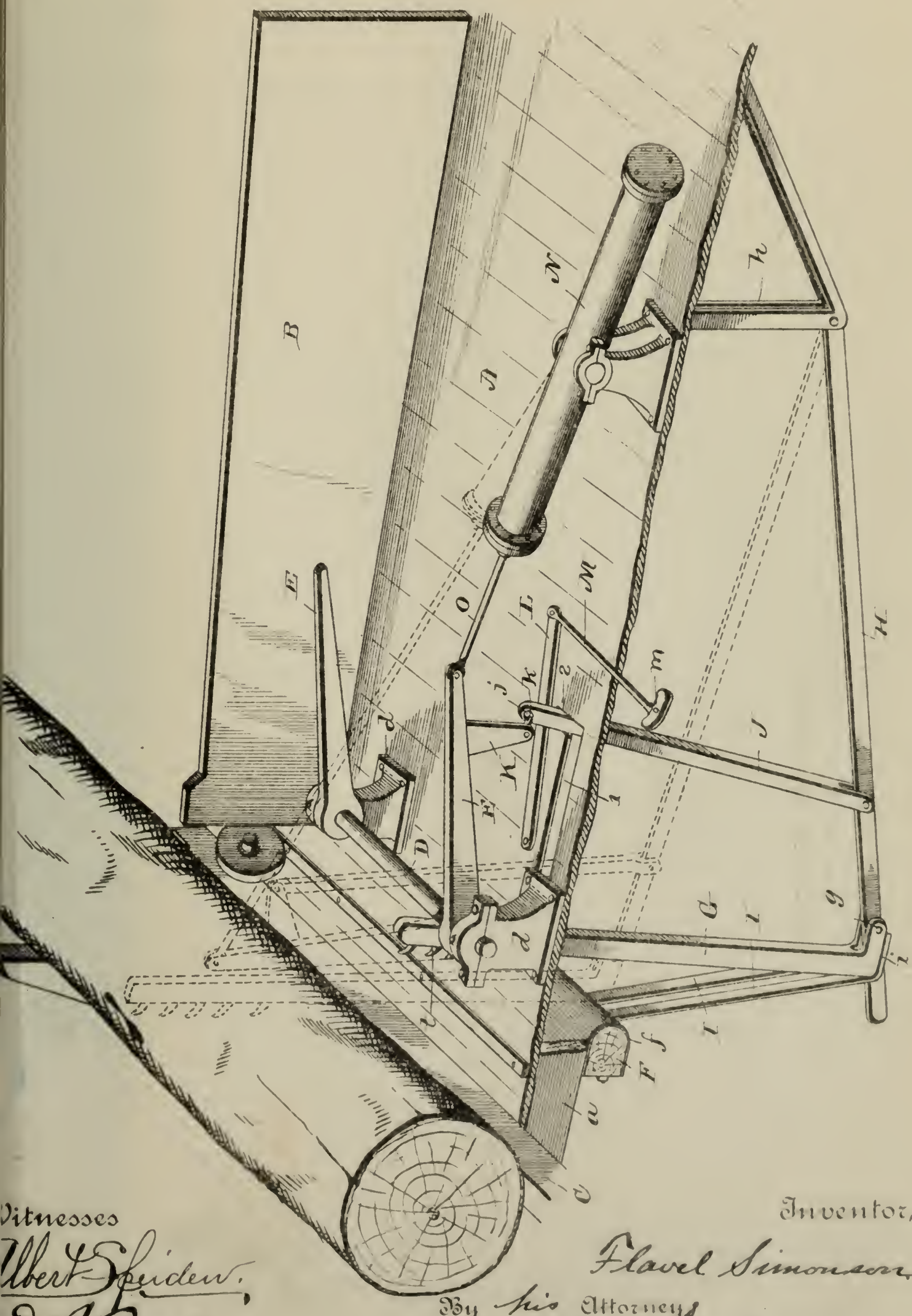
Witnesses:
WM. HUNTER MYERS,
ALBERT SPEIDEN.

(No Model.)

F. SIMONSON.

LOG LOADER AND TURNER.

No. 448,590. Patented Mar. 17, 1891.



Witnesses
Albert Spiden.
D. P. Cowl

Inventor,
Flavel Simonson
By his Attorneys,
Myers & Webster

UNITED STATES PATENT OFFICE.

FLAVEL SIMONSON, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO GEORGE H. CHAMBERLAIN, OF SAME PLACE.

LOG LOADER AND TURNER.

SPECIFICATION forming part of Letters Patent No. 448,590, dated March 17, 1891.

Application filed February 13, 1890. Renewed November 22, 1890. Serial No. 372,292. (No model.)

To all whom it may concern:

Be it known that I, FLAVEL SIMONSON, a citizen of the United States of America, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a certain new and Improved Log Loader and Turner, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to improvements in log loaders and turners designed to first load the saw-log onto the carriage and then turn it into the desired position, the object of the invention being the production of a machine of this class which will be simple in construction and swift in action.

The invention will first be described in connection with the accompanying drawing (which is a perspective view of the machine with a log upon the carriage) and then pointed out in the claims.

A is the floor of the mill, upon which the machine is set, part of the floor being removed to show certain parts located beneath it.

B is one of the logways; the other being removed.

C is the carriage, located in front of the logways.

D is a rock-shaft journaled in pillow-blocks *d* between the forward ends of the logways.

E are push-arms rigidly secured on the rock-shaft D.

F is a transverse beam secured to the floor-joists *a* directly under the near edge of the carriage. This beam is rounded on its rear edge and has a metal covering *f*.

G is a toothed bar for turning the log, the teeth *t* being secured to the bar in any suitable manner. The lower end of the bar G, which is passed down through the floor, is bent at a right angle, and is bifurcated, as shown, so as to straddle a raising-bar H, which is pivoted at one end to a bracket *h* underneath the floor, the bar G being pivoted at the end of its angular portion at *g* to the bar H.

I I are two metal strips secured at their upper ends to the beam F and extending downward and rearward, passing on each side of the bar H to serve as a guide for it. The lower ends of these guide-strips are bent rearward at an angle, as at *i*, and rest under the angular portion of the toothed bar when that bar is in its lowest position, thereby serving to hold the latter in a rearwardly-inclined position away from the log.

J is a link, whose lower end is loosely pivoted to bar H, its upper end passing through and working in an L-shaped slot 1 2, cut in the floor, to one side on an imaginary vertical line drawn from the pivotal point of the link, so that the link will gravitate sidewise. In the upper end of link J there is a hole *j*, adapted at proper times to receive a pin *k* on a lug K, secured to one of the push-arms E.

L is a lever pivoted horizontally at one end to the floor behind the link J, assuming the front of the latter to be toward the left of the machine, and M is a rod, one end of which is pivoted to the other end of the lever, its free end extending outward beyond the logway (not shown) and provided with a head *m*.

N is an oscillating steam-cylinder provided with the necessary appliances for supplying and utilizing steam. (Not shown.)

O is the piston-rod of the steam-cylinder, pivoted at its outer end to one of the push-arms E.

The operation of the machine is very simple. Assume that the log is on the logways over the push-arms. Now the operator admits steam to the rear end of the steam-cylinder, which drives the piston-rod forward, and thus, through its connection with one of the push-arms, rocks the shaft D, whereby the rear ends of both push-arms are raised, so as to roll the log off the arms and onto the carriage. When it is desired to turn the log, the operator presses his foot against the head of rod M, so as to pull lever L against link J, which is now in the portion 2 of the slot in the floor, when the pin *k* on lug K will enter the hole *j* in the link, thus connecting the link with the push-arm. Then he lets steam into the lower end of the cylinder, which raises the push-arm, and consequently the link, and the latter in turn pulls bar H upward, which is guided by the guide-strips I. As bar H rises, the toothed bar G is raised by it, the

latter swinging forward on its pivot g until it strikes against the log, as seen in dotted lines, the beam F preventing the toothed bar in its upward movement from coming into contact with the carriage. In the upward movement of the toothed bar its teeth will engage with the log and turn it. At this time the link J is in the portion 1 of the slot in the floor. After the log is turned the operator reverses the engine, when the parts will be brought down into the position of rest, when the link J will be opposite the portion 2 of the slot in the floor and gravitate away from its connection with the lug on the push-arm.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a raising-bar pivoted at one end to a suitable support, and mechanism for operating said bar, of a toothed bar having an angular bend at its lower end and pivoted to the raising-bar at the end of its angular portion, and a support for holding the toothed bar in an inclined position when at rest.

2. The combination, with a raising-bar pivoted at one end to a suitable support, and mechanism for operating said bar, of a toothed bar bifurcated at its lower end, the bifurcated portion being bent at an angle, passed over the raising-bar, and pivoted thereto at the end of its angular portion, and a support on each side of the raising-bar to hold the toothed bar in an inclined position when at rest.

3. The combination, with the pivoted raising-bar, a guide for said bar, a toothed bar bifurcated, bent, and pivoted to the raising-bar in the manner described, and a support for holding the bar inclined while at rest, of a rock-shaft having a fixed arm, mechanism for rocking the shaft, and a link pivoted at its lower end to the raising-bar and detachably connected at its upper end to the arm on the rock-shaft, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FLAVEL SIMONSON.

Witnesses:

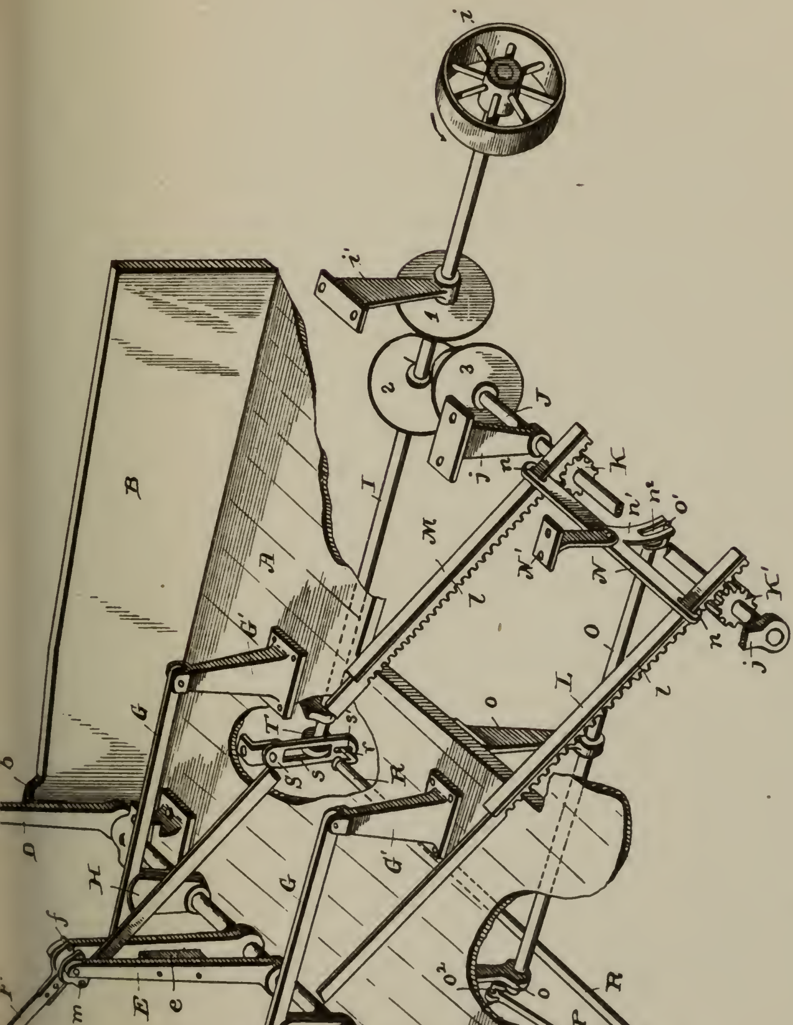
WM. HUNTER MYERS,
G. W. BALLOCH.

Model.)

F. SIMONSON.

LOG LIFTER AND TURNER.

. 448,591. Patented Mar. 17, 1891.



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lat Speiden.

P. Cowl

Inventor,

Flavel Simonson

By his Attorneys,

Myers & Webster

FLAVEL SIMONSON, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO GEORGE H. CHAMBERLAIN, OF SAME PLACE.

LOG LIFTER AND TURNER.

SPECIFICATION forming part of Letters Patent No. 448,591, dated March 17, 1891.

Application filed February 13, 1890. Renewed November 22, 1890. Serial No. 372,293. (No model.)

To all whom it may concern:

Be it known that I, FLAVEL SIMONSON, a citizen of the United States of America, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a certain new and Improved Log Lifter and Turner, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to certain improvements in log lifting and turning machines of the class in which the log is lifted from the logways, pushed onto the saw-mill carriage, and then drawn clear of the carriage in the operation of turning it.

The object of my present invention is to provide improved means for operating the rock-shaft and controlling the movements of the hook.

The invention will first be described in connection with the accompanying drawing, which is a perspective view of my machine, and then pointed out in the claims.

In the drawing, A represents the floor of the mill, upon which the machine is set, parts of the floor being broken out to show portions of the machine.

B is one of the logways, constructed in the usual manner. It will be understood that there are two of these logways, one at each side of the machine, and each of them has an abutment at *b*, against which the log rests at the time the machine is put into operation.

C is the rock-shaft, mounted in pillow-blocks *c*, and on the shaft, preferably outside of the pillow-blocks, are secured the push-arms D.

E E are two arms secured on shaft C a short distance apart, and in the upper ends of these arms is pivoted the hook F, which when down rests on a block *e*, secured between arms E. The butt of the hook is bifurcated, and each branch is separately pivoted to its respective arm E. On the rear end of each branch of the hook-butt there is formed an outwardly-projecting lug *f*, which rides freely over the upper rounded ends of arms E when the hook is canted forward to engage with the log, but which contact with the back of said arms when the hook is thrown up into the "reaching" position shown and serve to hold the hook in that position, thereby preventing the latter from being tilted over backward by any sudden jar. No claim to the hook is made in this application, as its novel features have been made the subject-matter of claim in another application filed by me in the United States Patent Office of even date herewith.

G′ are standards, in whose upper ends are pivoted the rear ends of the lifting-bars G, the free ends of these bars resting on cams H, keyed on the rock-shaft C. The front ends of the lifting-bars are sharpened, as shown, to prevent the log from slipping.

The construction of the lifting-bars and their attachment to standards form no part of the present invention, as these features are claimed in another application for United States Patent filed by me October 16, 1889, and numbered 327,168.

I is the power-shaft, provided with a belt-pulley *i*, which is connected with some suitable motor, the shaft being supported in hangers *i′*, depending from the floor. On this shaft are secured two beveled friction-wheels 1 2, which are adapted to be thrown into gear alternately with a like friction-wheel 3 on a shaft J, supported in hangers *j* and carrying two small pinions K K′.

L and M are two rack-bars, which, however, are provided with rack-teeth for only a portion of their length, the toothed portions of the bars being adapted to engage with the pinions K K′. One of these rack-bars L is pivoted to one of the push-arms, and the other rack-bar M is pivoted at *m* to the hook, eccentric to the point of pivotal attachment of the hook to the hook-arms. The toothed portions of the rack-bars are T-shaped in cross-section, and consequently the upper sides of the bars are flanged, as at *l*, for a purpose presently to be described.

N is a rocking yoke, pivoted centrally to a bracket N′, secured to the under side of the floor. Each end of the yoke has a T-shaped slot *n*, these slots being adapted to receive the flanged portions of the rack-bars L and M, and the yoke is provided centrally with an arm *n′*, the lower end of which is slotted, as at n^2.

O is a longitudinal shaft hung in hangers *o*, depending from the floor. The ends of this shaft are cranked, as at o' o^2, the crank

o' engaging in the slot in the arm n' of the yoke.

P is a link, one end of which is journaled on the crank o^2 of shaft O, its other end being pivoted to a lever Q, extending upward through the floor.

R is a transverse shaft supported in hangers. (Not shown.) One end of this shaft is pivotally connected with the lower end of lever Q, the other end of the shaft being cranked, as at r, for a purpose now to be explained.

S is a metal plate, pivoted at its upper end to a bracket S′, secured to the under side of the floor. This plate is slotted at s to partly pass over a disk T on the forward end of the power-shaft I, and below this slot s there is another slot s' to receive the crank r on shaft R.

The operation of my machine is as follows: Assume the parts of the machine to be in the positions shown and the power-shaft moving in the direction indicated by the arrow. The hook is now ready to drop and engage the log, assumed to be on the head-block. (Not shown.) Now the operator moves lever Q rearward, which rocks the shaft R, thereby swinging the plate S forward, which, through the engagement of the disk T with said plate moves the shaft I forward, so as to throw the friction-wheel 1 into engagement with wheel 3, thus turning shaft J backward. This movement draws the hook down into engagement with the log, draws the log off from the head-block, and turns it, by which time the push-arms D have fallen to near a level with the lifting-bars G. The operator then pushes lever Q forward again, so as to throw friction-wheels 2 and 3 into gear, when the push-arms are moved forward, pushing the log back onto the head-block, the hook in this movement releasing its hold on the log and rising to the position shown. Lever Q is now brought to a perpendicular in order to throw all the friction-wheels out of gear and stop the machine. When this is done, the operator moves the lever sidewise away from the machine, which movement, through link P, rocks shaft O, and consequently the yoke N. As the yoke is rocked the rack-bar M is raised out of mesh with pinion K and rack-bar L is forced down into mesh with pinion K′. Then the lever is moved to the rear throwing friction-wheels 1 and 3 into gear, so as to run the rack-bars backward and pull the push-arms and hook-arms and hook down into their normal position below a level with the lifting-bars. As these parts are drawn down into this position by the rack-bar L, it is apparent that as the rack-bar M is free of its pinion K it would slide backward at once, and thus permit the hook to fall back onto the log, were there no provision for arresting this sliding of that bar. It will be noticed, however, that as the yoke is not in a level position the bar M is subject to considerable friction in moving through the slot in the yoke, this friction being sufficient to overcome the backward pressure exerted by the weight of the hook when in the reaching position. By the time, however, that the hook-arms have arrived at about a horizontal position the gravity of the hook will overcome that friction, bar M will slide backward, and the hook will fall down onto the block e.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the rock-shaft, the push-arms and the hook-arms secured thereon, and the hook pivoted to the hook-arms, of a shaft bearing two pinions, mechanism for turning said shaft in either direction at will, a rack-bar pivoted to the hook and adapted to engage with one of the pinions, a rack-bar pivoted to one of the push-arms and adapted to engage with the other pinion, and means for throwing either of the rack-bars out of and the other into engagement with the pinions at will, for the purposes set forth.

2. The combination, with the rock-shaft, the push-arms and the hook-arms secured thereon, and the hook pivoted to the hook-arms, of a shaft bearing two pinions, mechanism for turning said shaft in either direction at the will of the operator, two flanged rack-bars adapted to engage with said pinions, one of said bars being pivoted to the hook and the other to one of the push-arms, a pivoted yoke whose ends are in engagement with the flanges on the rack-bars, and mechanism for rocking the yoke, for the purposes set forth.

3. The combination, with the pinion-shaft carrying two pinions and capable of being rotated in either direction at the will of the operator, and the two rack-bars pivoted as described and adapted to engage with the pinions, of the centrally-pivoted yoke in engagement with the rack-bars at its ends and provided with a downwardly-extending slotted arm, a shaft cranked at each end, the crank on one end engaging with the slot in the yoke-arm, a pivoted lever, and a link one end of which is journaled on the other crank on the said cranked shaft, its other end being pivoted to the lever, for the purposes set forth.

4. The combination, with the power-shaft bearing friction-wheels 1, 2 and disk T, of shaft J, bearing friction-wheel 3 and pinions K K′, rack-bars L M, pivoted as described, yoke N, provided with slotted arm n', shaft O, having cranks o and o', shaft R, having crank r, the slotted plate S, pivoted as described, lever Q, pivoted to shaft R, and link P, connecting lever Q and shaft O, all arranged substantially as described, and for the purposes set forth.

In testimony whereof I affix my signature in presence of two witnesses.

FLAVEL SIMONSON.

Witnesses:

WM. HUNTER MYERS,

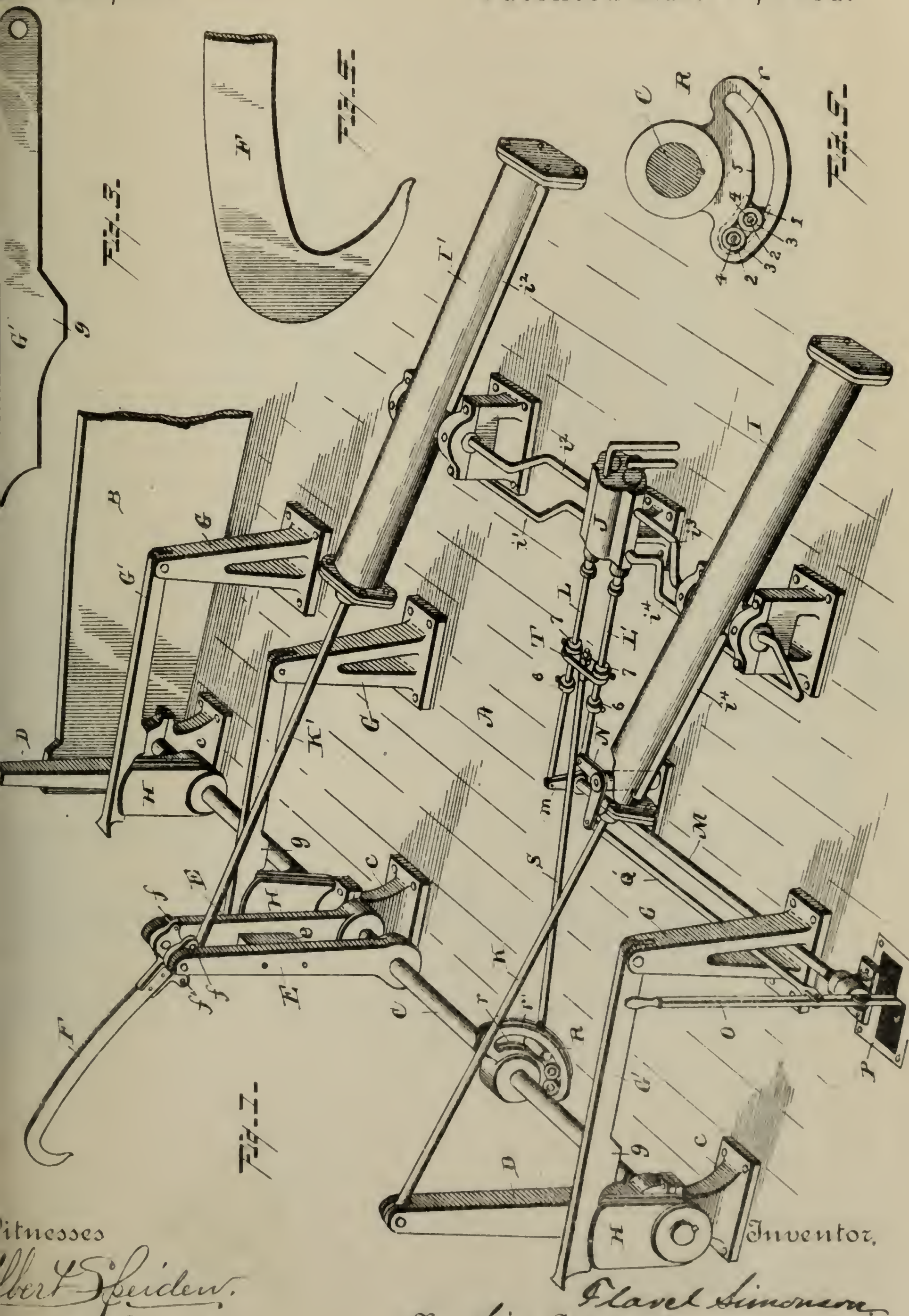
G. W. BALLOCH.

(No Model.) 2 Sheets—Sheet 1.

F. SIMONSON.

LOG LIFTER AND TURNER.

No. 448,592. Patented Mar. 17, 1891.



Witnesses

Albert Speiden.

D. P. Cowl

Inventor.

Flavel Simonson

By his Attorneys,

Munn & Webster

(No Model.)

2 Sheets—Sheet 2.

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LOG LIFTER AND TURNER.

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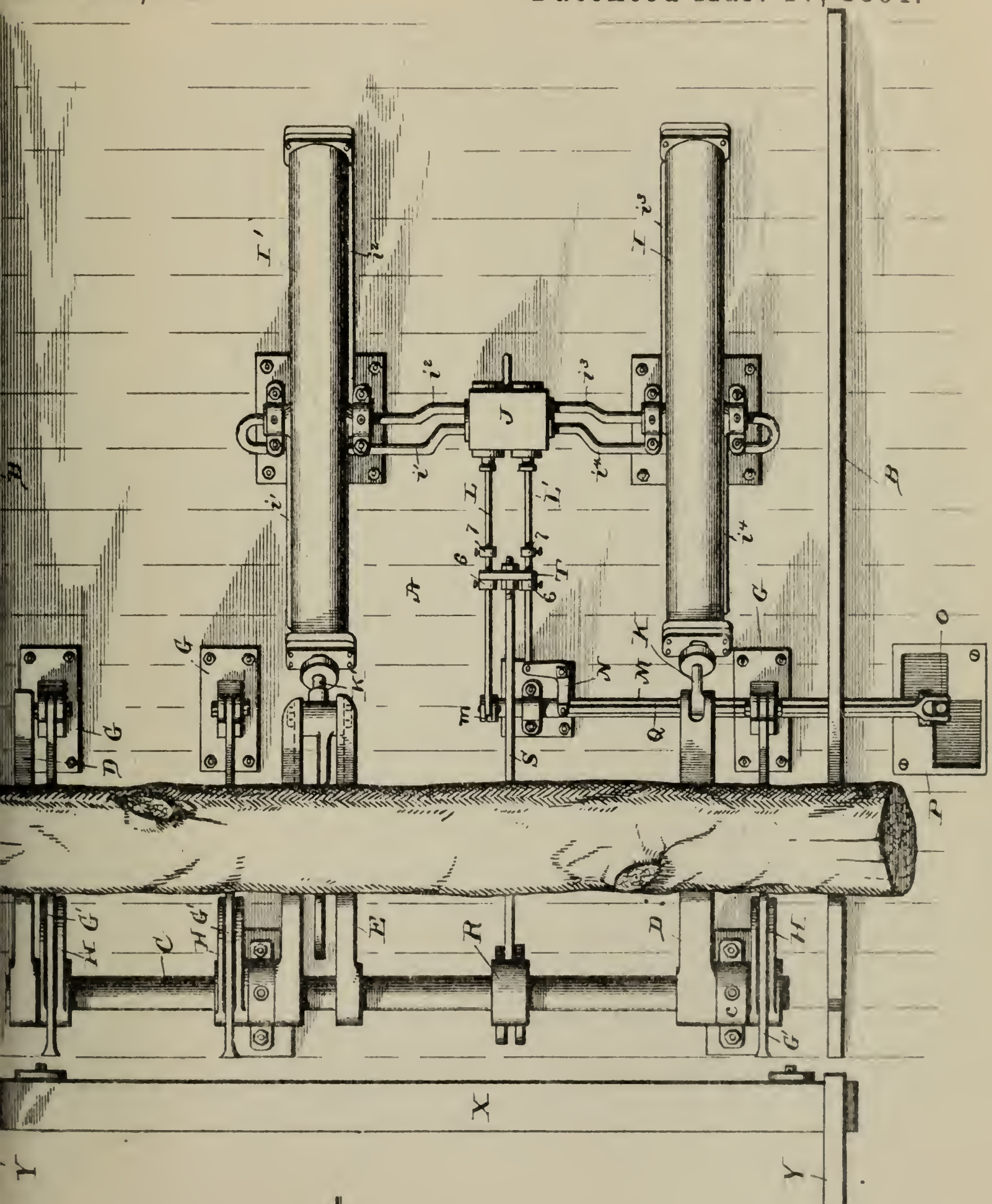

Fig. 2.

Witnesses

Albert Speiden.

D. P. Cowl

Inventor.

Flavel Simonson.

By his Attorneys,

Myers & Webster.

UNITED STATES PATENT OFFICE.

FLAVEL SIMONSON, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO GEORGE H. CHAMBERLAIN, OF SAME PLACE.

LOG LIFTER AND TURNER.

SPECIFICATION forming part of Letters Patent No. 448,592, dated March 17, 1891.

Application filed February 13, 1890. Renewed November 22, 1890. Serial No. 372,294. (No model.)

To all whom it may concern:

Be it known that I, FLAVEL SIMONSON, a citizen of the United States of America, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a certain new and Improved Log Lifter and Turner, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to new and useful improvements in log lifting and turning machines of the class in which the log is lifted from the logways, pushed onto the carriage, and drawn clear of the carriage in the operation of turning it.

The principal object of my present invention is to provide means whereby the piston-rods of two steam-cylinders may be utilized in operating the rock-shaft and the hook, in this manner rendering the movements of the operative parts of the machine very rapid.

Another object of this invention is to provide means whereby all the various movements of the operative parts of the machine may be controlled by a single lever.

A still further object of my invention is the improvement of certain detail parts of the machine.

The invention will first be described in connection with the accompanying drawings, and then pointed out in the claims.

Figure 1 is a perspective view of the machine in position to turn the log, the carriage and log being omitted. Fig. 2 of the drawings is a plan view of the machine at rest with a log on the lifting-bars, and also showing the log-carriage. Fig. 3 is a side elevation of one of the lifting-bars. Fig. 4 is a side elevation of a portion of the hook. Fig. 5 is a side elevation of the quadrant.

In the drawings, A is the mill-floor upon which the machine is set; *x*, the log-carriage; Y, its head-blocks, and B a portion of one of the logways.

C is a rock-shaft mounted in pillow-blocks *c*, and D are push-arms secured on the shaft.

E E are two arms secured on the shaft C a short distance apart, and in the upper ends of these arms is pivoted the hook F, which when down rests on a block *e*, secured between arms E. The butt of the hook is bifurcated, and each branch is separately pivoted to its respective arm E. On each branch of the hook-butt there is formed an outwardly-projecting lug *f*, which rides freely over the upper rounded ends of arms E when the hook is canted forward to engage with the log, but which contact with the back of said arms when the hook is thrown up into the "reaching" position shown in Fig. 1, thereby preventing the hook from being tilted over backward by any sudden jar.

A very serious objection to hooks of the common form is that in withdrawing the hook from the log it is apt to gouge or split the timber, this being due to the fact that the bend of the hook is made on a true curve. To avoid this objection I change the curve near the point by giving that portion of the hook a slight outward bend, thereby making it concave on the outer side and convex on the inner side. By this construction, when the hook is being withdrawn from the log its point will not move in the arc of a circle, but will leave the log at nearly a right angle.

G are standards, in whose upper ends are pivoted the rear ends of the lifting-bars G′, the forward ends of these bars resting on cams H, keyed on the rock-shaft C. As shown, the front ends of the bars are sharpened to prevent the log from slipping. While the log is lying on these bars prior to being raised, the push-arms, the hook-arms and hook, and the cams are in their lowest position, or below the level of the lifting-bars G, as seen in Fig. 2. Now, in order that the log may be fully raised before the push-arms come into contact with it, it is essential that the cams act on the lifting-bars in a hurried manner, and in order that they may be able to do this and still not raise the lifting-bars too high in moving up to their vertical position I form projections *g* on the under side of the bars, giving the forward ends of these projections a gradual curve, as clearly shown in Fig. 3.

In another application for United States Letters Patent filed by me October 16, 1889, and numbered 327,168, I have shown, described, and claimed the lifting-bars having sharpened ends and pivoted to standards, and therefore I lay no claim to those specific features in this specification, the only feature of

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the lifting-bars herein claimed being that of the above-mentioned projections.

I I′ are two oscillating steam-cylinders connected with a steam-chest J by suitable pipes i' i^2 i^3 i^4 for conveying the steam in front of and in rear of the pistons. The piston-rod K of cylinder I is pivoted to one of the push-arms D, and the piston-rod K′ of cylinder I′ is pivoted to the hook at f', eccentric to the pivotal points of the hook to its arms.

L L′ are the valve-stems of the engine, one of which L is pivoted to a crank m on one end of a shaft M, the other valve-stem L′ being pivoted to one arm of a horizontal bell-crank N. The outer end of shaft M is pivoted to a lever O, whose lower end passes down through an opening in the floor covered by a stop-plate P, as shown.

Q is a link pivoted to a lever O above shaft M and also to an arm of the bell-crank N.

R is a quadrant fixed on the rock-shaft C. As will be seen, this quadrant is slotted annularly, as at r, and also radially, as at r'. Inside of the radial slot is placed a metal plate 1, as seen in dotted lines in Fig. 5, which is adjustably secured therein by means of bolts 2, passing through a washer 3, and provided with nuts 4.

S is a pitman provided with a T-head, which lies horizontal in the annular slot in the quadrant, the rear wall of that slot being cut on a straight line at 5 for the purpose of allowing the head to be turned in that position after having been inserted through the radial slot. The other end of the pitman is secured in a yoke T, which works loosely on the valve-stems between collars 6 and 7, adjustably secured on the stems.

The operation of my machine is as follows: The first thing to be done is to adjust the cut-off of the steam. To do this I first turn the rock-shaft so that the quadrant will be down and the T-head of the pitman at the end of the slot. I then set the valves on the center and set the collars 6 against the yoke. I next open the valves and set collars 7 against the yoke. Now I turn the rock-shaft so as to bring the quadrant up, as shown in Fig. 1, close the valves, place the yoke against collars 7, and finally adjust the quadrant-plate 1 against the T-head of the pitman. Now assume that the parts of the machine are in the position shown in Fig. 2. The operator pulls lever O sidewise away from the machine, which movement through link Q and bell-crank N opens the port communicating with pipe i^3 and admits steam into the rear end of cylinder I, driving its piston-rod forward, and thereby rocking shaft C forward. The cams H now come into contact with the projections g on the lifting-bars, raising the bars quickly, and then pass off these projections into the curves in front of the projections, which curves compensate for the arc of the circle described by the cams, preventing the bars from being raised too high. By this time the push-arms have come into contact with the log, and in the continued forward rocking of shaft C they push the log off onto the head-blocks of the carriage, the hook meanwhile remaining down on the block e. The pitman, through the quadrant and the yoke, has now centered the valves and also drawn lever O back into a perpendicular position. The operator now draws the lever to the rear, which movement, through shaft M and its crank m, opens the port communicating with pipe i', leading steam into the forward end of the cylinder I′, driving its piston-rod backward, and thereby rocking shaft C and its connected ports back into their normal positions of rest and lowering the lifting-bars. Now, when it is desired to turn the log, the operator pushes the lever forward, rocking shaft M and its crank m so as to open the port communicating with pipe i^2 and leading steam into the rear end of cylinder I′. As the piston-rod is pushed forward, rocking shaft C forward, the hook is raised to the position shown in Fig. 1, ready to be engaged with the log, by which time the quadrant has acted on the pitman to close the valves. The operator now pulls lever O backward, opening the port communicating with pipe i', leading steam into the forward end of cylinder I′. As the piston-rod K′ is moved backward the hook is drawn down into engagement with the log, and in its backward movement pulls the log with it until the latter strikes against the ends of the lifting-bars, which stand in a plane below the axis of the log. Now, as the hook continues to draw upon the log the latter makes a quarter-turn, and in so doing is drawn up onto the lifting-bars, entirely clear of the head-blocks. The log is now to be pushed back onto the head-blocks, and for this purpose the operator moves lever O forward to admit steam into the rear end of cylinder I′, which results, as before stated, in rocking shaft C forward, releasing the hook from the log and raising it to the position shown in Fig. 1. It is now desired to bring all the parts to positions of rest without the hook coming into contact with the log, and to do this the operator pushes lever O sidewise toward the machine, admitting steam through pipe i^4 into the forward end of cylinder I, thereby rocking shaft C backward. As piston-rod K′ is not now in action, it offers some resistance in being pushed backward by the hook, and this resistance, at the pivotal point f', which is eccentric to the points of pivotal attachment of the hook to its arms, tends to hold the hook elevated until about the time all the parts have arrived at rest, when it will drop down by gravity onto the block e.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a log lifting and turning machine, the combination, with pivoted lifting-bars, a rock-shaft carrying push-arms, hook-arms, and cams for raising the lifting-bars, and a hook

pivoted to the hook-arms, of two steam-cylinders whose piston-rods are pivoted to one of the push-arms and to the hook, respectively, a steam-supply for the cylinders, and mechanism for governing the admission of steam to either cylinder at will, for the purposes set forth.

2. The combination, with pivoted lifting-bars, a rock-shaft carrying push-arms, hook-arms, and cams for raising the lifting-bars, and a hook pivoted to the hook-arms, of two steam-cylinders whose piston-rods are pivoted to one of the push-arms and to the hook, respectively, a steam-chest common to both cylinders, and mechanism controlled by a single lever for admitting steam to either cylinder at will, for the purposes set forth.

3. The combination, with the rock-shaft carrying the push-arms and the hook-arms, and a hook pivoted to the hook-arms, of two steam-cylinders whose piston-rods are pivoted to one of the push-arms and to the hook, respectively, a steam-chest common to both cylinders and having two valve-stems, a yoke having limited movement on said stems, a quadrant having an adjustable plate, and a pitman connecting the yoke and the quadrant, for the purposes set forth.

4. In a log lifting and turning machine of the class described, the combination, with two steam-cylinders whose piston-rods are pivoted to one of the push-arms and to the hook, respectively, and a steam-chest having two valve-stems, of a cranked shaft pivotally connected to one of the valve-stems, a lever to which the other end of said shaft is pivoted, a bell-crank to one arm of which the other valve-stem is pivoted, and a link pivotally connecting the lever and the bell-crank, for the purposes set forth.

5. In a log lifting and turning machine, the combination, with a rock-shaft carrying push-arms and cams, of lifting-bars whose rear ends are pivoted to fixed supports, their free ends resting on the cams, each of said bars having a projection upon its under side, the front end of which recedes to a level with the bar in a curve coincident with the arc described by the cam, for the purposes stated.

6. In a log lifting and turning machine of the class described, the combination, with the rock-shaft and means for operating it, of a hook-support secured on said shaft, a hook concave on its outer side near the point and convex on its inner side opposite said concavity, pivoted to said support, and a reciprocatory rod or bar pivoted to the hook, for the purposes stated.

7. In a log lifting and turning machine of the class described, the combination, with the rock-shaft and means for operating it, of the hook-arms secured on said shaft, a hook having a bifurcated butt pivoted between the upper ends of the hook-arms, each branch of the butt having an outwardly-projecting lug, and a reciprocatory rod or bar pivoted to the hook, for the purposes stated.

In testimony whereof I affix my signature in presence of two witnesses.

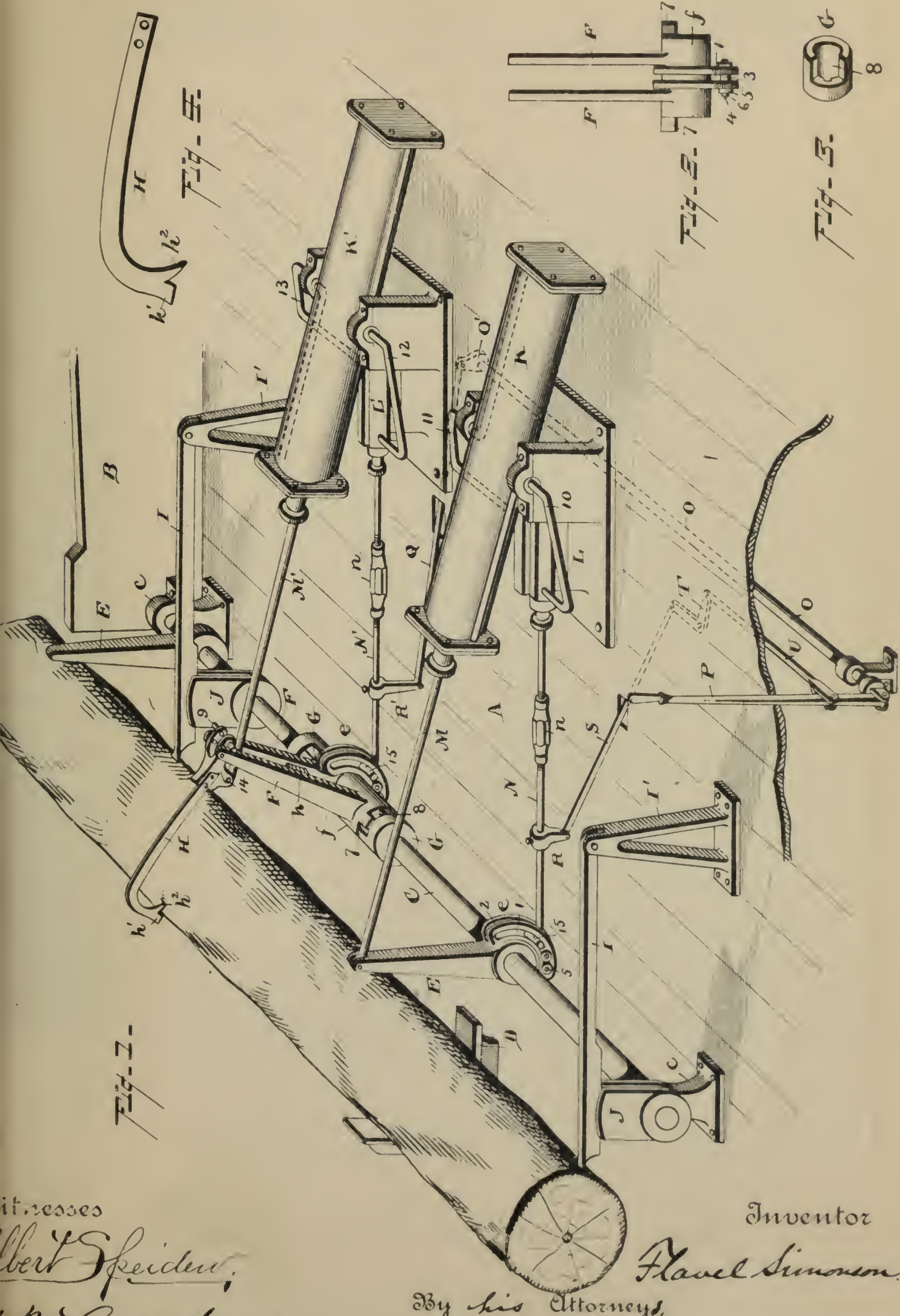
FLAVEL SIMONSON.

Witnesses:
WM. HUNTER MYERS
G. W. BALLOCH.

(No Model.)

F. SIMONSON.
LOG LIFTER AND TURNER.

No. 448,593. Patented Mar. 17, 1891.



itnesses

lbert Speiden

M Copenhaver.

Inventor

Flavel Simonson

By his Attorneys,

Myers & Webster

United States Patent Office.

FLAVEL SIMONSON, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO GEORGE H. CHAMBERLAIN, OF SAME PLACE.

LOG LIFTER AND TURNER.

SPECIFICATION forming part of Letters Patent No. 448,593, dated March 17, 1891.

Application filed May 26, 1890. Renewed February 24, 1891. Serial No. 382,323. (No model.)

To all whom it may concern:

Be it known that I, FLAVEL SIMONSON, a citizen of the United States of America, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a certain new and Improved Log Lifter and Turner, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to certain new and useful improvements in log lifting and turning machines of the class in which a log is lifted from the logway, pushed onto the carriage, and turned by mechanism controlled by a single lever, such a machine being shown and described in an application for Letters Patent of the United States filed by me on the 13th day of February, 1890, and numbered 340,338.

One object of my present invention is to provide for the operation of the hook-carrying arms independent of the operation of the push-arms, whereby a round log may be turned after it has been pushed onto the carriage and the hook may be withdrawn out of the way of the carriage the instant the log is pushed back into position, thereby very materially increasing the operative speed of the machine.

Another object of my invention is the production of a hook that will disengage itself from the log when the latter is turned.

My invention consists, first, in mounting the hook arms loosely upon the rock-shaft and in engagement with recessed collars rigidly secured on said shaft; secondly, in a novel construction of the hook, which is provided with a horn, the purpose of which is to contact with the log when the latter has been turned and cause the disengagement of the hook, and, thirdly, in providing each steam-cylinder with a steam-chest and connecting each valve-stem with a quadrant upon the rock-shaft, whereby the respective valves may be centered independently of each other.

Figure 1 of the drawings is a perspective view of a machine embodying my improvements. Fig. 2 is a front elevation of the hook-arms and their hub. Fig. 3 is a perspective view of one of the recessed collars. Fig. 4 is a side elevation of the hook.

In the drawings, A is the mill-floor, upon which the machine is set; B, the logways, only one of which is shown; C, the rock-shaft, mounted in pillow-blocks *c*; and D the carriage head-blocks, only one being shown.

E E are the push-arms, keyed or otherwise rigidly secured on the rock-shaft C. On one of these arms there is formed a quadrant *e*, for a purpose which will be explained farther on. As will be seen, the quadrant is slotted annularly, as at 1, and also peripherally, as at 2. Inside of the annular slot is placed a metal block 3, as seen in Fig. 2, which is adjustably secured therein by means of bolt 4, passed through a washer 5 and provided with nut 6. This quadrant is shown and described in my former application, above alluded to, as a separate casting secured on the rock-shaft.

F F are the hook-arms. Instead of forming these arms separate and rigidly securing them upon the rock-shaft C, as I have done heretofore, I now cast them integral with a hub *f*, having a projecting lug 7 on each end, and integral with the hub there is also cast a quadrant *e*, in all respects similar to the one on one of the push-arms above described. I mount this hub loosely on the rock-shaft C between two collars G, keyed on the shaft, with the lugs on the hub lying within recesses 8, cut in the inner end of the collars. As will be seen in the drawings, these recesses 8 in the collars are of considerably greater width than the lugs 7 on the hub, and the collars are so adjusted on the shaft that when the hook-arms are down in the position of rest the upper walls of the recesses will bear upon the upper edges of the lugs.

In the upper ends of the hook-arms F is pivoted the hook H, which when down rests on a block *h*, secured between the arms. The butt of the hook is bifurcated, and each branch is separately pivoted to its respective arm F. On each branch of the hook-butt there is formed an outwardly-projecting lug 9, which lugs ride freely over the upper rounded ends of arms F when the hook is canted forward to engage with the log, but contact with the backs of said arms when it is thrown up into the reaching position, thereby preventing the hook from being tilted over backward by any sudden jar. For the

purpose of causing the hook to disengage itself from the log when the latter has been turned to the desired position, I provide it with a horn h', in front of and preferably in line with the hooked portion h^2. As will be seen in the drawings, the horn is somewhat shorter than the hooked portion and has a blunt end, which, on coming in contact with the log, will cause the hooked portion to be lifted out of engagement with the latter.

I represents the lifting-bars, pivoted at their rear ends to stands I', the forward ends of the bars resting on cams J, keyed on the rock-shaft C.

K K' are two oscillating steam-cylinders connected, respectively, with two steam-chests L L' by suitable pipes 10 11 and 12 13, as seen in full and dotted lines. The piston-rod M of cylinder K is pivoted to one of the push-arms E, and the piston-rod M' of cylinder K' is pivoted to the hook H at 14, eccentric to the pivotal points of the hook to its arms.

N N' are the valve-stems of the engines, each of which is made in two pieces, these being connected by a right-and-left screw-threaded sleeve n, as seen in the drawings, and each stem is provided with a T-head 15, which lies horizontal in the annular slot in one of the quadrants e, the stem N connecting with the quadrant on the push-arm and the stem N' connecting with the quadrant on the hub of the hook-arms.

O is a shaft located underneath the mill-floor, to one end of which is pivoted the operating-lever P, which extends upward through the floor, and on the other end of this shaft there is rigidly secured a crank O', to which is pivoted one end of a rod Q, which passes up through the floor, and is pivoted at its other end to an arm R', secured on the valve-stem N'.

On the valve-stem N is secured another arm R, similar to the one on stem N', and to this arm is pivoted one end of a rod S, whose other end is pivoted to one arm of a bell-crank T, underneath the floor. Another rod U is pivotally connected to the other arm of this bell-crank and to the operating-lever P.

The operation of my machine is as follows: The first thing to be done is to provide for cutting off the steam. To do this I first turn the rock-shaft C so that the quadrants e will be down and the T-heads of the valve-stems at the forward ends of the slots 1, after which I center the valves by lengthening or shortening the valve-stems by means of the sleeves n. I next turn the push-arms and the hook-arms up as far as it is desired to have them go, each set separately, and then adjust the quadrant-blocks 3 against the T-heads of the valve-stems. Now assume that the rock-shaft C is turned so as to bring the cams, the push-arms, and the hook-arms into a horizontal position, with the hook down between its arms, and that a log rests upon the logways B and over the lifting-bars I, when, as will be evident from the foregoing description, all the valve-ports will be closed. The operator (who for convenience of description is presumed to be facing the log) now pushes lever P to the right, which movement, in an obvious manner, opens one of the valve-ports in the steam-chest L and admits steam through the pipe 11 to the rear end of cylinder K, forcing its piston and piston rod forward and rocking shaft C forward, when the cams will raise the lifting-bars and thus lift the log clear of the logways, by which time the push-arms will bear against the log and push it onto the head-blocks of the carriage, the arms continuing to swing forward for that purpose until the quadrant reaches a position to cause the valve-stem to center the valve and throw lever P back to its normal position. While this movement of the push-arms to place the log upon the head-blocks is going on, however, the operator pushes lever P forward, which works shaft O forward, and thus opens one of the ports in steam-chest L' and admits steam through pipe 12 to the rear end of cylinder K', forcing its piston and piston-rod forward, thereby raising the hook-arms and throwing the hook up into a position to engage with the log at any desired point in its circumference, when he immediately reverses the lever to open the other port in steam-chest L' and admit steam through pipe 13 to the front end of cylinder K', which results in drawing the hook down onto the log, and then, as the hook is at the same time being drawn backward, the log, resting against the lifting-bars and push-arms, will be turned to the desired position, by which time, the hook no longer having a hold upon the log, the hook-arms and hook will fall back to their normal positions. The operator now pushes lever P to the left, and thereby admits steam through pipe 10 to the forward end of cylinder K and rocks shaft C and its attached push-arms and cams back to their normal positions of rest.

Thus far the description applies to a round log; but we will now assume that a slab has been cut and it is desired to turn the log for another cut. The operator in this case first admits steam to cylinder K' behind the piston, which drives its piston-rod forward and raises the hook and hook-arms, and as the lugs on the hook-arms engage with the collars on the rock-shaft the latter is turned, thereby raising the push-arms, the cams, and the lifting-bars. He then reverses the action of the piston in cylinder K', which draws the hook down onto the log and rearward, thus turning the log, the hook-arms meanwhile turning backward loosely on the rock-shaft, and then when the log has been turned the hook will leave it and the hook-arms and hook will drop to the position of rest. Next he admits steam to the rear end of cylinder K, rocking shaft C forward, raising the log and pushing it back into place upon the head-blocks, and finally he rocks shaft C back into position of rest.

Having thus described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

1. In a log lifting and turning machine of the class described, the combination, with the rock-shaft bearing rigidly-attached cams and push-arms, mechanism for rocking the shaft, and pivoted lifting-bars operated by said cams, of a hook-carrier loosely mounted on the rock-shaft, stops for limiting the movements of the hook-carrier, and mechanism for turning said carrier upon the shaft and operating the hook, substantially as described.

2. In a log lifting and turning machine of the class described, the combination, with the rock-shaft bearing rigidly-attached cams and push-arms, mechanism for rocking the shaft, and pivoted lifting-bars operated by said cams, of two recessed collars rigidly fixed on the rock-shaft, two hook-arms joined at their lower ends to a hub loosely mounted on said shaft between the collars, the hub having lugs resting in the recessed portions of the collars, a hook pivoted between the upper ends of the hook-arms, and mechanism for turning the hook-arms upon the shaft and operating the hook, substantially as described.

3. In a log lifting and turning machine of the class described, the combination, with the rock-shaft and a hook-carrier mounted on said shaft, of a hook having a horn on its curved end, and mechanism for operating the hook, for the purpose set forth.

4. The combination, with the rock-shaft bearing rigidly-attached cams and push-arms and a loosely-mounted hook-carrier, and pivoted lifting-bars operated by said cams, of two steam-cylinders, each having a piston-rod, one pivoted to the hook and the other pivoted to one of the push-arms, a steam-chest for each cylinder, provided with an adjustable valve-stem, two quadrants upon the rock-shaft with which the valve-stems are connected, and lever mechanism for operating the valve-stems, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FLAVEL SIMONSON.

Witnesses:
E. Q. NYE,
PERLEY PITKIN.

(No Model.) 2 Sheets—Sheet 1.

J. W. POWERS.
STEAM ENGINE.

No. 483,014. Patented Sept. 20, 1892.

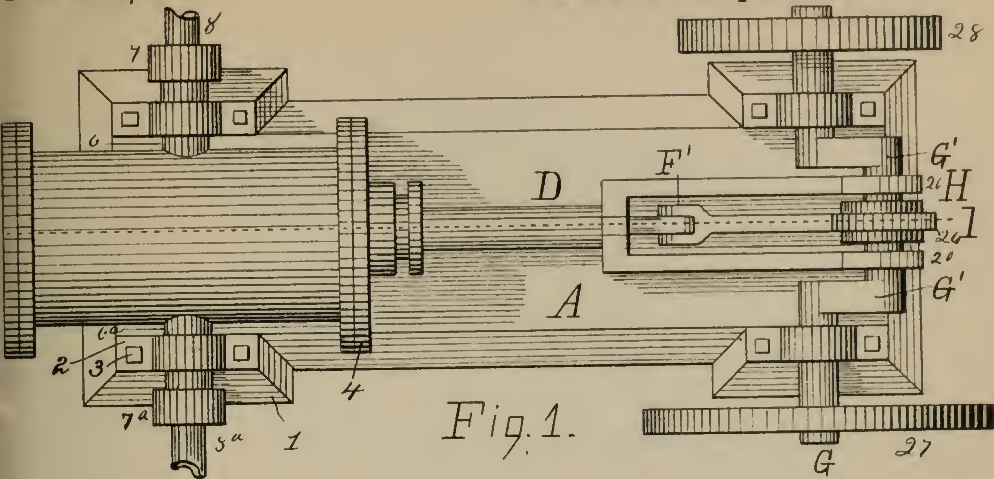


Fig. 1.

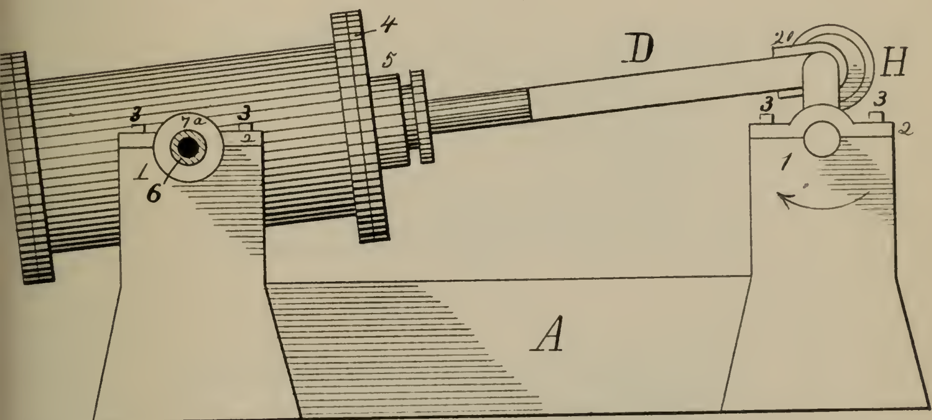


Fig. 2.

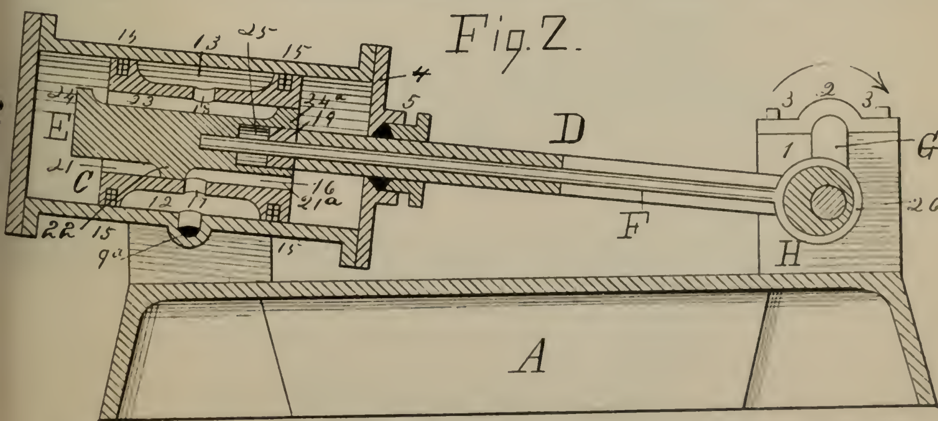


Fig. 3.

Witnesses
~~Walter Tamariss~~
Chas. J. Stockman.

Inventor
Jay W. Powers

(No Model.) 2 Sheets—Sheet 2.

J. W. POWERS.
STEAM ENGINE.

No. 483,014. Patented Sept. 20, 1892.

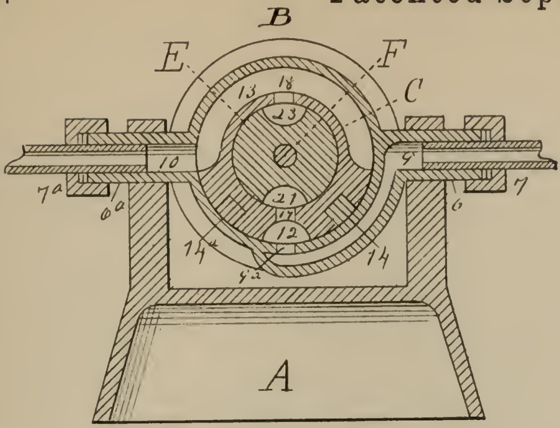


Fig. 4.

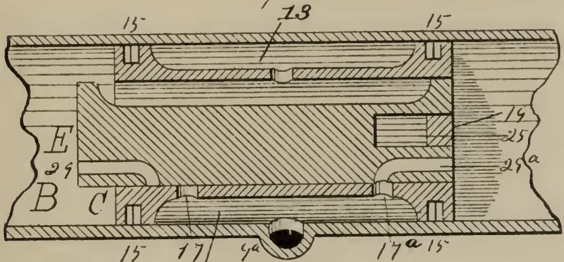


Fig. 5.

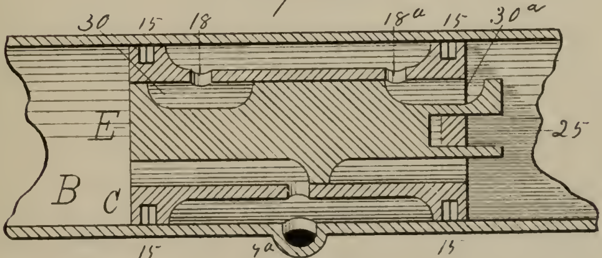


Fig 6.

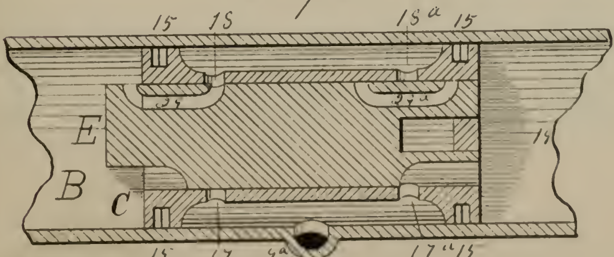


Fig. 7.

Witnesses
~~[illegible]~~ Tamarzi
Chas. J. Stockman

Inventor
Jay W. Powers

United States Patent Office.

JAY W. POWERS, OF CHICAGO, ILLINOIS.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 483,014, dated September 20, 1892.

Application filed April 9, 1892. Serial No. 428,503. (No model.)

To all whom it may concern:

Be it known that I, JAY W. POWERS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Steam-Engines, of which the following is a specification.

This invention relates to steam-engines, and has for its object the production of an engine of the character known as "reciprocating piston," in which, first, many of the parts heretofore deemed essential to the practical operation of engines of this character are dispensed with, thereby materially simplifying its construction and materially lessening its cost; second, the boiler-pressure upon the piston and the first expansion of the steam within the cylinder is secured, thereby receiving the full force of the steam upon the part whereby it may best be utilized; third, both the valve and piston will receive and both will transmit the power of the steam to the crank-shaft, thereby utilizing the power at present employed in actuating the valve or valves, and, fourth, the steam will be admitted to the cylinder in such manner that the piston and valve will be balanced and their gravity overcome.

To these ends the invention consists in certain peculiarities in the construction, arrangement, and combination of the several parts, substantially as hereinafter described, and particularly pointed out in the subjoined claims.

In the accompanying drawings, Figure 1 is a top plan view of the entire engine; Fig. 2, a side elevation with the balance-wheel and driving-pulley removed. Fig. 3 is a longitudinal vertical section from I to I. Fig. 4 is a vertical cross-section through the trunnions, and Figs. 5, 6, and 7 longitudinal vertical sections of modified forms of the piston and valve.

Throughout the several views the same reference letters and figures refer to the same parts.

A is the bed or frame; B, the cylinder; C, the piston; D, the piston-rod; E, the valve; F, the valve-stem; G, the crank-shaft; G′, the crank, and H the eccentric.

The cylinder B, piston C, and valve E should be made of the same material, in order that their contraction and expansion due to changes in temperature will be uniform.

The bed or frame A may be of any desired form of construction, but should be of sufficient weight to break the vibrations of the working parts, thereby giving the engine stability. It is provided with the four pillow-blocks 1, having the caps 2 held in place by the bolts 3. Two of these pillow-blocks are formed to provide bearings for the trunnions of the cylinder, and the other two support the crank-shaft G.

The cylinder B is provided with the heads 4, one of which is furnished with the stuffing-box 5. It is also provided midway between its opposite ends and on its opposite sides with the trunnions 6 6^a, having the stuffing-boxes 7 7^a, which render steam-tight the supply and exhaust pipes 8 8^a entering them. Opening into one of these trunnions 6 is the upper horizontal end of a passage 9, the remainder of said passage extending downward in a curvilinear course a quarter of a circle through the wall of the cylinder B (which is made thicker at this point for the purpose) and its inner end communicating with the interior of the cylinder through a port 9^a, the whole forming a supply-passage for the steam. The other trunnion 6^a has the passage 10 extending through it horizontally, piercing the side wall of the cylinder B, thus forming an exhaust-passage for the steam.

The piston C is a little more than half as long as the cylinder B and is provided upon its supply (under) side with the longitudinal groove 12, which is at all times in communication with the supply-passage 9, and upon its exhaust (upper) side with the semi-annular longitudinal groove 13, at all times in communication with the exhaust-passage 10. It is also provided with the longitudinal packings 14 14 and with the annular packings 15 15, and finally it is provided with the central longitudinal chamber 16, communicating with the longitudinal groove 12 through the supply-port 17 and with the semi-annular groove 13 through the exhaust-port 18.

The piston-rod D is attached to the horizontal cross-bar 19 of the piston C and passes out through the stuffing-box 5, where after (providing for its stroke) it is divided into two

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parallel bars, which extend to and are connected with the crank H by means of the strap-joints 20. Its cylindrical or single portion is pierced longitudinally to provide a passage for the valve-stem F.

The valve E is a little longer than the piston C, the purpose of which will hereinafter be seen. It is fashioned to fit within the central chamber 16 of the piston C closely and yet be movable longitudinally therein. It is provided upon its supply (under) side with the two longitudinal grooves 21 21ª, extending inward from its opposite ends, their approaching (inner) ends being separated by the central wall 22, and upon its exhaust (upper) side with the longitudinal groove 23, extending nearly its entire length, but stopped off by the end walls 24 24ª. Its forward end is provided with a recess 25, which permits it to pass outward and beyond the horizontal cross-bar 19 of the piston C.

The valve-stem F is attached to the center of the valve E, passes out through the pierced piston-rod D, and extends to and is connected with the eccentric H by the eccentric-strap 26. It consists of two parts coupled together outside the tubular portion of the piston-rod D by means of the knuckle-joint F′. It should be provided with a stuffing-box at the outer end of its tubular passage to render it steam-tight; but I do not deem it necessary to show said stuffing-box in my drawings.

To one of the outer ends of the crank-shaft G is attached the balance-wheel 27, and to the opposite end thereof the driving-pulley 28. The eccentric H is also rigidly attached to the crank G′, between the outer divided end of the piston-rod D and in line with the valve-stem F, but is adjustable thereon, its adjustment being an important matter, as its position in relation to the throw of the crank G′ determines the point at which the live steam is cut off and the distance traveled by the piston on expansion. Its proper position is about ninety degrees in lead of the crank G′—that is to say, when the crank is at its upward throw (the position shown in Fig. 2) the throw of the eccentric should be outward, and when the crank is at its downward throw (the position shown in Fig. 3) the throw of the eccentric should be inward. Thus set the crank G′ will revolve in the direction indicated by the arrows and the engine will run forward; but it is obvious that the simple reversal of its position upon the crank will cause the latter to revolve in an opposite direction to that indicated and the engine will then run backward.

The operation of my engine is as follows: Steam generated in a suitable boiler is conducted to the cylinder B through the supply-pipe 8, traverses the supply-passage 9 of the trunnion 6, and passing through the groove 12 and the port 17 of the piston C and the groove 21ª of the valve E enters the outer end of the cylinder B, forcing the piston C and valve E inward, the exhausted steam in the inner end of the cylinder B meanwhile escaping through the groove 23 of the said valve E, the exhaust-port 18, and the groove 13 of the said piston C, the passage 10 of the trunnion 6ª, and the exhaust-pipe 8ª. Now through this inward stroke of the piston and valve the crank G′ has been carried around to its inward and the eccentric H (thereunto attached) to its upward throw. At this position the supply-port 17 and the exhaust-port 18 are both closed by the central wall 22 and the end walls 24 24ª of the valve E, and the momentum of the balance-wheel 27 must now carry the piston and valve past their dead-center, when, through the eccentric H being in lead of the crank G′, the valve moves outward a short distance within the piston, thereby bringing the port 17 of the piston C and the groove 21 of the valve E into register, and at the same time opening the port 18 of the piston C by carrying the end wall 24ª of the valve E outward and beyond the piston C, thereby letting the supply-steam into the inner end of the cylinder B, which forces the piston and valve outward and at the same time allows the exhausted steam in the outer end of the cylinder B to escape through the groove 23, port 18, groove 13, passage 10, and pipe 8ª, as above described.

In the modification shown in Fig. 5 I have two ports 17 17ª on the supply (under) side of the piston C as substitutes for the one port 17 and have two ducts 29 29ª on the supply (under) side of the valve E as substitutes for the grooves 21 21ª. (Shown in Fig. 3.)

In the modification shown in Fig. 6 I have two ports 18 18ª on the exhaust (upper) side of the piston C as substitutes for the one port 18 and have two longitudinal grooves 30 30ª on the exhaust (upper) side of the valve E as substitutes for the one groove 23. (Shown in Fig. 3.)

In the modification shown in Fig. 7 I have two ports 17 17ª on the supply (under) and two other ports 18 18ª on the exhaust (upper) side of the piston C as substitutes for the supply-port 17 and the exhaust-port 18 and have two ducts 29 29ª on the exhaust (upper) side of the valve E as substitutes for the groove 23. (Shown in the drawings.)

From the above the advantages of my invention will readily be seen and appreciated by those familiar with steam-engines.

It will be noted that by having the valve chambered within and forming a part of the piston, both receiving and both transmitting the power of the steam to the crank-shaft, I utilize to drive the latter the power at present employed in actuating the valve or valves. It will be still further noted that as the steam is admitted through the lower side of the cylinder and always against the grooved lower side of the piston the piston and valve are balanced by its upward pressure, thus overcoming their gravity, and also that by dispensing with the guides and cross-head I simplify construction and reduce friction.

In short, an engine constructed after the plan above specified and now in use has developed a higher rate of speed and a greater percentage of power than has heretofore been deemed attainable.

Changes in the details of construction other than those above described may suggest themselves to the skilled mechanic, and therefore I do not wish to be understood as limiting myself to the exact construction herein shown and described, but reserve to myself the liberty of changing the details without departing from the spirit and intent of my invention.

Having now described my invention, what I believe to be new, and desire to secure by Letters Patent, is—

1. The combination, in a steam-engine, with the cylinder having inlet and outlet ports and passages and a longitudinally-chambered piston-head within said cylinder having inlet and outlet ports, of a longitudinally-grooved valve operating within said piston-head and with but in advance of the same and a shaft connected both with said piston-head and valve, substantially as described, whereby both the piston-head and valve will be acted upon by the steam and both transmit motion to said shaft, as specified.

2. The combination, in a steam-engine, with the cylinder having entrance and exit ports, a tubular piston-rod, and a valve operating within the chamber in said piston-head and having its rod extending through said piston-rod, of a crank-shaft, to the crank portion of which the outer end of said piston-rod is connected, and an eccentric mounted on the crank portion of said crank-shaft and having the outer end of the valve-rod connected to it, said eccentric being mounted on said crank so as to be in lead of the throw thereof, substantially as described, and for the purposes specified.

3. The combination, in an engine, with the oscillating cylinder having hollow trunnions, one of which forms the entrance and the other the exit-port for the steam, said cylinder also having passages, one leading from the entrance-port and the other to the exit-port, and its inner wall pierced to form a port leading from its entrance-passage to its interior, of a chambered piston-head operating within said cylinder and having suitable steam passages and ports, a longitudinally-grooved valve within said piston-head, and a crank-shaft connected with and operated by said piston and valve.

4. The combination, in a steam-engine, with the cylinder having inlet and outlet ports, of a longitudinally-chambered piston-head within said cylinder, said piston-head having exterior steam-passages always in communication with the inlet-port of the cylinder and also having entrance and exit ports, a longitudinally-grooved valve within said piston-head, and a shaft to which said piston-head and valve are independently connected, substantially as described, and for the purposes specified.

JAY W. POWERS.

Witnesses:

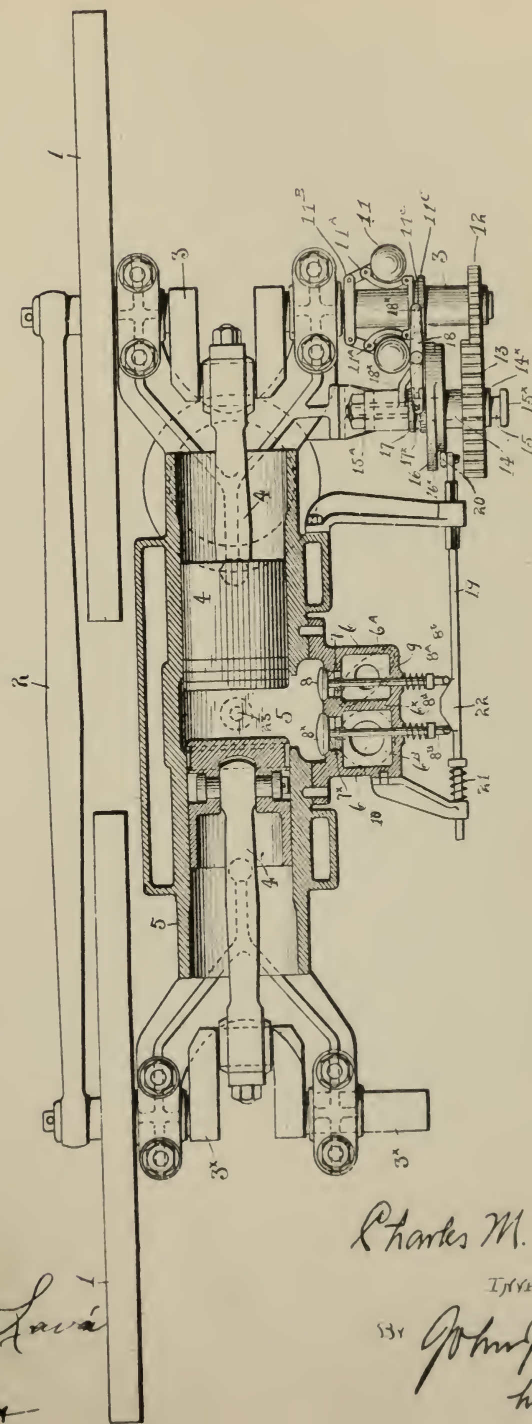
CHAS. J. STOCKMAN,

WALTER TEMARISS.

(No Model.)

C. M. RHODES.
GAS ENGINE.

No. 531,861. Patented Jan. 1, 1895.



Witnesses.

Michael Lavá

Wm Searle

Charles M. Rhodes

Inventor

By John Jolley Jr

his Attorney.

UNITED STATES PATENT OFFICE.

CHARLES M. RHODES, OF WAYNE, PENNSYLVANIA.

GAS-ENGINE.

SPECIFICATION forming part of Letters Patent No. 531,861, dated January 1, 1895.

Application filed March 17, 1894. Serial No. 504,068. (No model.)

To all whom it may concern:

Be it known that I, CHARLES M. RHODES, of Wayne, in the county of Delaware and State of Pennsylvania, have invented certain new and useful Improvements in Gas-Engines, of which the following is a specification, due reference being had to the accompanying drawing, forming a part hereof.

My invention relates generally to engines, and specifically to a construction of engine best adapted for the use of gas, oil or the like in generating and transmitting power, and has special reference to certain novel features of construction and operation in a preferred horizontal design or form of engine hereinafter fully described, to the end that the same shall be cheap and simple in construction, economic in operation and reduce to a minimum all frictional wear of the parts.

In the drawing I have shown so much of a gas-engine embodying my invention as is necessary to illustrate the construction and operation of the same, the view being a plan sectional one taken as to the central longitudinal axis of the engine.

Referring now to the drawing in which the several parts are indicated by numerals, similar numerals denoting like parts wherever found, 1 1 is a pair of fly or driving-wheels and 2 the driving arm connecting the same and working them in unison; the former properly mounted on respective crank-shafts 3, $3^\times$ suitably journaled in proper bearings therefor. Connected to these crank-shafts are pistons and piston-heads 4, 4, working simultaneously in opposite ends of a cylinder 5,—that is to say, making in and out strokes together. Midway the extent of this cylinder 5, at one side thereof, is a jacket 6 divided by a partition $6^\times$ forming two compartments or chambers 6^A 6^B, and having two port or valve openings 7, $7^\times$ in communication with the chamber of the cylinder 5 each provided preferably with a puppet valve 8, $8^\times$ mounted for end to end movement only; and further provided on its under surface or bottom with two ports 9, 10, respectively in open communication with the respective chambers 6^A 6^B of said jacket 6. The stems 8^A 8^B of the valves 8, $8^\times$, extend beyond the jacket 6 after passing through its respective chambers, and on their outer ends are preferably provided with springs and rollers 8^a 8^b all for purposes hereinafter fully explained.

A high-speed-governor 11 is suitably mounted by means of toggle-connections 11^A with a pair of collars 11^B 11^C on a crank-shaft 3—the collar 11^C provided with an annular groove 11^c. The outer end of the said shaft 3 is provided with a cog-gear 12 meshing with another cog-gear 13 (the gearing being preferably in two to one relation as to diameter) mounted on a sleeve 14 working on a pin or arm 15 adjacent to said crank-shaft 3. The sleeve 14 is further provided with a double cam-wheel 16, $16^\times$ and a collar 17 provided with a groove $17^\times$, while the pin 15 is provided with a head $15^\times$ at its outer end and a jam-nut 15^A at its opposite end, the gear 13, sleeve 14, cam-wheel 16, $16^\times$ and collar 17 being preferably made in one casting, and when mounted on the pin or arm 15, which is stationary, has endwise play between the head $15^\times$ and nut 15^A of said arm 15, for a purpose presently made clear.

18 is an arm having a pin or stud $18^\times$ $18^\times$ at each end working respectively in the grooves 11^c and $17^\times$ in the periphery of the collars 11^C and 17; said arm 18 being pivotally mounted and fulcrumed between said collars for a purpose to be explained.

The cam-wheel 16, $16^\times$ is double in construction, so to speak, that is to say, two cams in one integral structure, one of said cams 16 having an even periphery, while the other cam $16^\times$ has an uneven or irregular shaped periphery or face that at one point thereof merges and becomes flush with the periphery of its component part 16, for a reason hereinafter more fully set forth.

Mounted horizontally in suitable bearings adjacent to the valve-stems 8^A 8^B and cam-wheel 16, $16^\times$, is a rod or shaft 19, provided at one end with a roller 20, kept in contact with the cam 16, $16^\times$ by a spring 21 at the opposite end of the rod or shaft. This rod or shaft 19 is further provided with a cam 22, preferably of a construction having a flat top and inclined sides, working in conjunction with the valve-stems 8^A 8^B to raise and lower the same to open and close the valves.

23 indicates igniting means of any preferred

construction adapted to timely explode a charge of gas or the like at the completion of the compression of the gas.

Having now described the several component parts of an engine constructed in accordance with my invention, the operation is as follows:

To take in a charge of gas, the pistons being at the center of the cylinder and all the parts in position represented in the drawing, and the port 9 in connection with a source of gas-supply, a turn is given the driving-wheels 1 1 which rotate the crank-shafts 3 $3^{\times}$ and component parts and draw the pistons to the respective ends of cylinder 5, the roller 20 on the rod 19 sinking into a low depression on the periphery of the part $16^{\times}$ of the cam-wheel as the latter slowly rotates, and the rod 19 is moved toward the cam-wheel 16, $16^{\times}$ by the action of its spring 21. This forward movement of the rod 19 causes the valve-stem 8^{A} of the mixing chamber 6^{A} of the jacket 6 to ride the cam 22 on the rod 19 and open the valve 8, the gas flowing through the port 9 into the chamber 6^{A} and thence through the open valve 8. to the piston or compression-cylinder 5. Simultaneously with this action the rotating parts are increasing in momentum and the roller 20 in turn travels up a presented inclined periphery of the cam-portion $16^{\times}$, pushing backward the rod 19 and permitting the gradual closing of the valve 8 as the rod-cam 22 moves away from the valve-stem 8^{A} and the latter descends the inclined side of said cam 22 until the valve is closed. At this time the pistons will have reached the respective ends of the cylinders 5 and completed the outer or first stroke, the charge of gas has been taken in and all port connections with the piston cylinder closed, while the governor 11 will have greatly increased in speed, whereupon the pistons immediately commence their inward, second or compression stroke. The governor 11 as its speed increases gradually opens or spreads its ball-ends, and in so doing lifts or draws backward on the shaft 3 the collar 11^{C}, and this by reason of its toggle-connection 11^{A} therewith. This action of the governor on the collar 11^{C} in the groove 11^{c} whereof works one end of the pivoted fulcrumed arm 18, causes the opposite end of said arm 18 which works in a groove of the collar 17 on an adjacent arm 15 to move forward on said arm the collar 17, cam-wheel 16, $16^{\times}$, sleeve 14 and gear 13 until the boss $14^{\times}$ reaches the head $15^{\times}$ of said arm 15. During this operation the roller 20 has slowly reached the highest point on the periphery of the cam-portion $16^{\times}$, which as stated, is flush with the periphery of the cam-portion 16, and by reason of the high speed now attained by the governor and the consequent moving through the fulcrum connection 18, of the parts mounted on the arm 15,—the roller 20 is caused to mount or travel toward the periphery of the said cam-portion 16. At this time the pistons have completed their inner or second stroke and the act of compression is completed and ignition or explosion now takes place causing the pistons to quickly make their next outer or third stroke and so imparting increased momentum to the rotating parts and the driving-wheels 11, and the power so derived transmitted thence in the usual manner. As stated, at the time of the completion of the act of compression, the roller 20 had about reached the highest periphery of the cam $16^{\times}$. The explosion and consequent increased momentum so imparted, speeds the governor 11 and causes it to complete its full action on the several parts through the medium of the fulcrum 18 as previously stated, whereupon the roller 20 will mount and travel on the periphery of the cam-portion 16, thus moving backward the rod 19 and causing the valve stem 8^{B} to travel the cam 22 on said rod, as the latter moves under the same, and open the exhaust-valve $8^{\times}$ and the pistons have now completed their third stroke. The speed of the governor now decreases as the force of the power generated by the explosion diminishes, allowing the parts to gradually return to their first positions—the pistons making their next inner or fourth stroke exhausting the exploded gas through the valve $8^{\times}$, chamber 6^{B} and exhaust-port 10, at the completion of which stroke the waste gas will be exhausted from the cylinder 5, the exhaust valve $8^{\times}$ closed and all the parts again in position to take in a charge of gas and repeat the operation of mixing, compressing, igniting or exploding and exhausting charges of gas or the like for the purposes hereinbefore set forth.

I desire it understood that I do not wish to restrict my invention to the exact construction of parts as shown and described, as it is obvious that many changes in detail of construction may be adopted without departing from the spirit of my invention strictly as such; and though I have herein described my invention as employing gas as a means of generating power, slight changes of construction entirely within the skill of a person skilled in the particular art of manufacture and operation of engines of the class described would adapt the same for the use of oil or other power generating medium employed in an engine.

I claim—

1. In a gas or other engine in combination with the piston cylinder, its pistons, crank-shaft and other connected gearing; mixing and exhaust chambers having supply and exhaust ports respectively and valved connection with the piston cylinder, a high-speed governor, collars on a crank-shaft rotating therewith and of which one is grooved and movable thereon, means intermediate said governor and collars for sliding the grooved-collar as the speed of the governor increases or decreases, a stationary arm mounted adjacent thereto, carrying a movable sleeve provided with a grooved-collar, a cam-wheel and a cog-

wheel, the latter meshing with a cog-wheel mounted on said shaft and rotated by the same, means intermediate said grooved-collars and in contact therewith for sliding the sleeve and its mounted parts as the speed of the governor increases or decreases, and means intermediate said cam-wheel and valves for opening and closing the valves at predetermined intervals, as and for the purposes set forth.

2. In a gas or other engine the following elements in combination: the piston cylinder, its pistons, crank-shafts and other connected gearing therefor, mixing and exhaust chambers having supply and exhaust ports respectively and each provided with valved connection with the piston cylinder, the valve-stems whereof extend through and beyond said chambers, a high-speed governor, collars on a crank-shaft and rotating therewith, one of which is grooved on its periphery and movable on said shaft and means intermediate said governor and collars for sliding the grooved-collar as the speed of the governor increases or decreases; a stationary arm mounted adjacent thereto and carrying a movable sleeve provided with a collar having an annular peripheral groove, a cam-wheel of the character described and a cog-wheel, the latter meshing with a cog-wheel mounted on the crank-shaft stated, and rotated by the same, a pivoted fulcrumed arm, the respective ends of which are adapted to work in the grooved-collars stated, a sliding rod, means for retaining the same in contact with the cam-wheel and provided with means adapted to act in conjunction with the valve-stems to open and close the valves stated at predetermined intervals, and means for igniting charges of gas and the like, as and for the purposes set forth.

In testimony whereof I have hereunto signed my name this 16th day of March, A. D. 1894.

CHARLES M. RHODES.

In presence of—
A. P. RUTHERFORD,
JOHN JOLLEY, Jr.

(No Model.)

6 Sheets—Sheet 1.

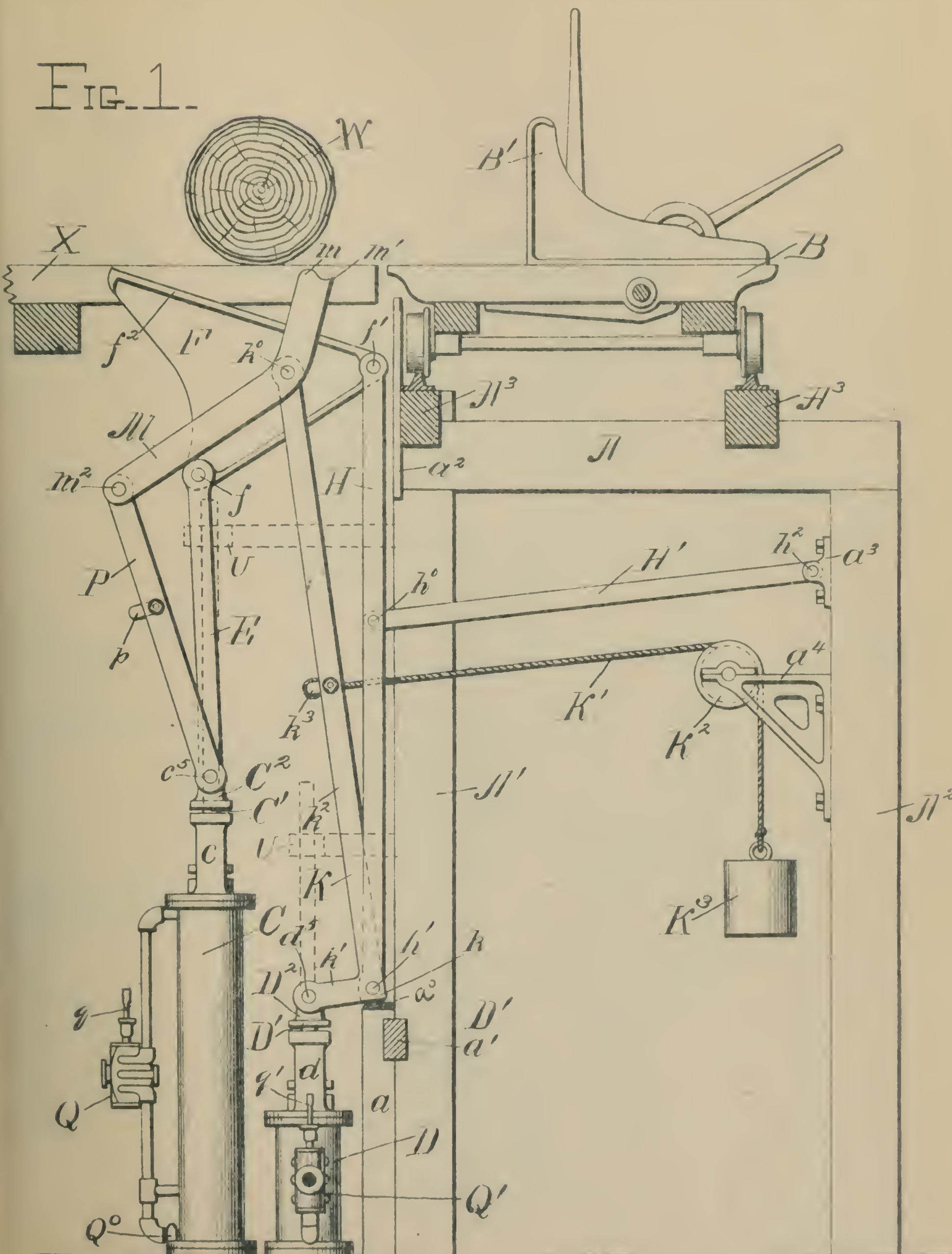
P. McNERNEY.

STEAM LOG LOADER AND TURNER.

No. 559,192.

Patented Apr. 28, 1896.

FIG. 1.



Witnesses
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6 Sheets—Sheet 2.

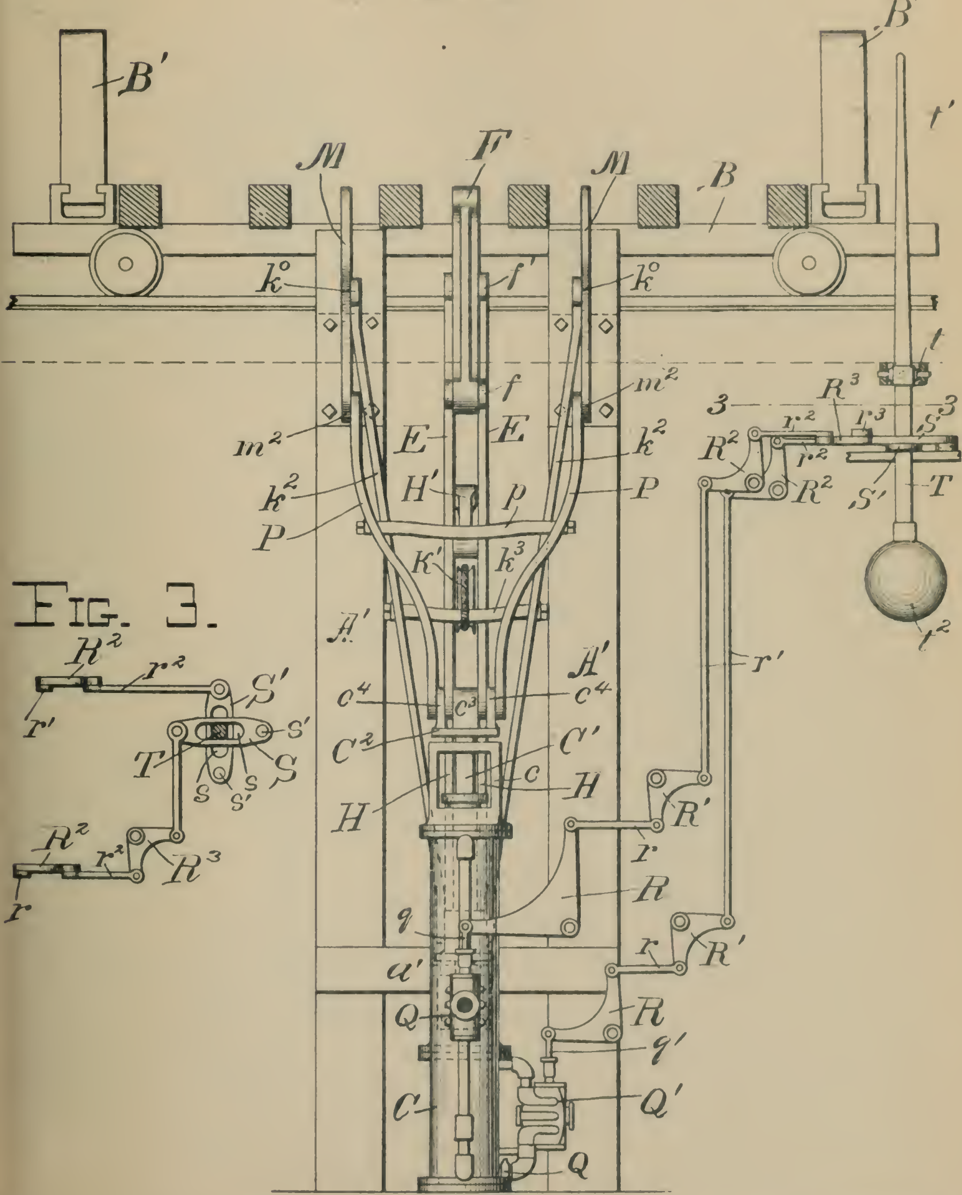
P. McNERNEY.

STEAM LOG LOADER AND TURNER.

No. 559,192.

Patented Apr. 28, 1896.

FIG. 2.



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Model.) 6 Sheets—Sheet 3.

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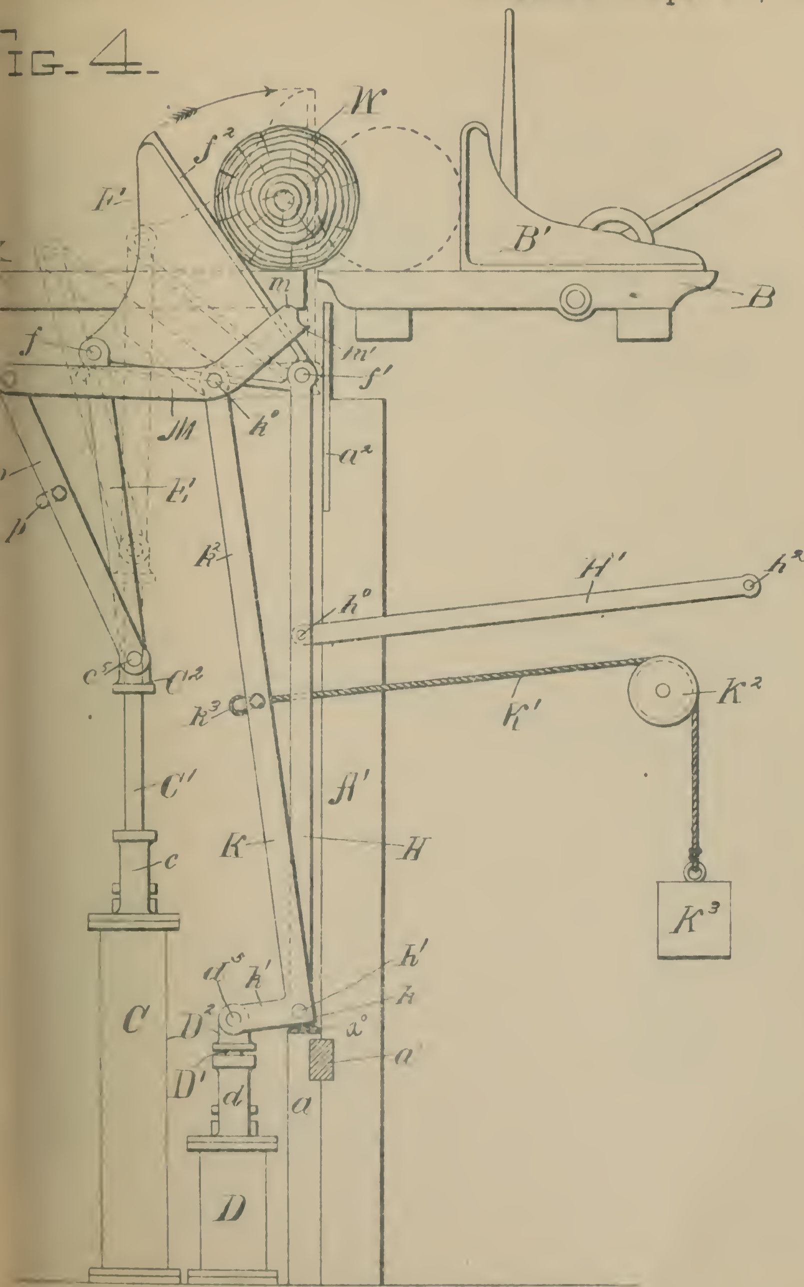
STEAM LOG LOADER AND TURNER.

). 559,192. Patented Apr. 28, 1896.

IG. 4.



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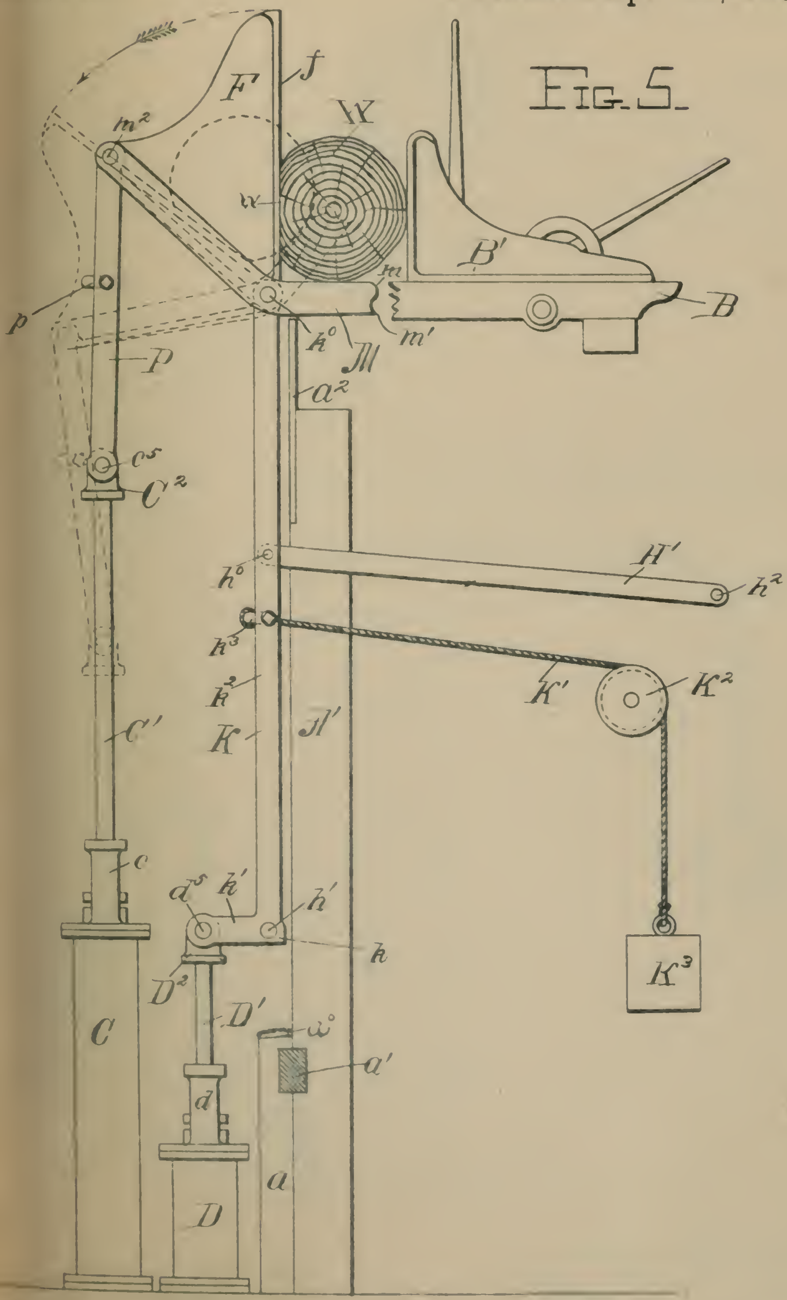
P. McNERNEY.

STEAM LOG LOADER AND TURNER.

559,192. Patented Apr. 28, 1896.



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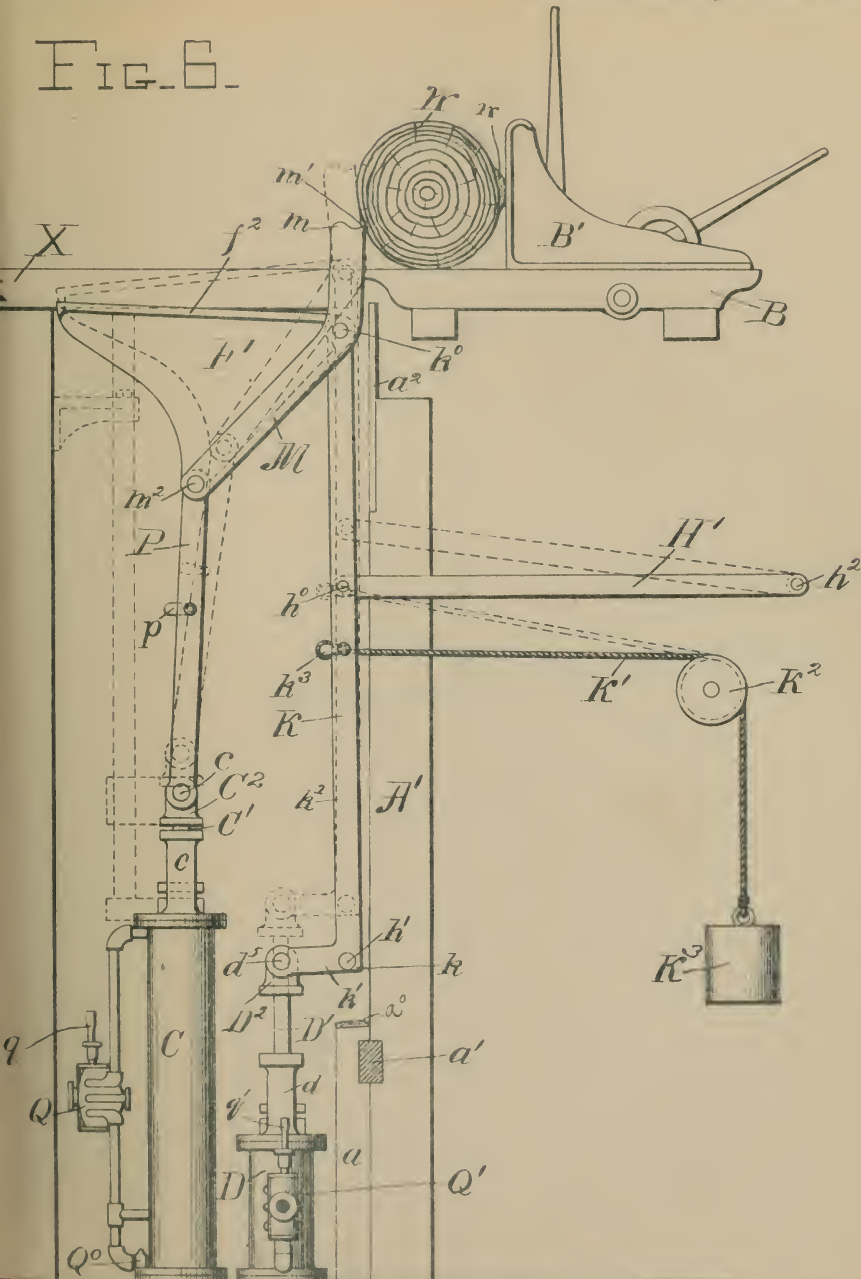
6 Sheets—Sheet 5. 232

P. McNERNEY.

STEAM LOG LOADER AND TURNER.

No. 559,192. Patented Apr. 28, 1896.

FIG. 6.



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UNITED STATES PATENT OFFICE.

234

PETER McNERNEY, OF MARINETTE, WISCONSIN.

STEAM LOG LOADER AND TURNER.

SPECIFICATION forming part of Letters Patent No. 559,192, dated April 28, 1896.

Application filed November 6, 1895. Serial No. 568,101. (No model.)

To all whom it may concern:

Be it known that I, PETER McNERNEY, a citizen of the United States, residing at Marinette, in the county of Marinette and State of Wisconsin, have invented certain new and useful Improvements in Steam Log Loaders and Turners; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in apparatus for loading and turning logs or cants on a sawmill-carriage by mechanical means.

According to this invention the log or cant is moved by a plurality of movable arms coming either separately or together into direct contact with one or more of the sides of the log or cant, whereby the log may be shoved laterally or "loaded," as it is generally termed, or the same may be lifted bodily or may be turned about its axis through any desired angle. The motive power used is preferably fluid-pressure, such as steam; but any suitable power may be adopted. Moreover, the mechanism for transmitting the required motion to the arms may be varied in many ways.

One means of carrying out the said invention is shown in the drawings, to which reference is now had.

Figure 1 represents a cross-section through a sawmill-carriage and the log-deck and shows the apparatus in elevation out of operation or in the initial position. Fig. 2 represents an end view of the apparatus as seen from the left of Fig. 1. Fig. 3 represents a detail plan view of the lever connections for operating the valves of the fluid-pressure cylinders. Fig. 4 is a diagrammatic view showing the operation of the apparatus in loading a log onto the sawmill-carriage. Fig. 5 represents a diagrammatic view of the apparatus in the operation of turning down a log that has been slabbed on one side for the purpose of presenting a fresh side to the saw; and Fig. 6 represents, diagrammatically, the manner in which the log is turned through a small angle about its axis in order to get a knot clear of the knees or head-blocks or to adjust a log so that any imperfections therein may be properly presented to the saw-line, or for other purposes; and Fig. 7 represents a modification in which the vertical support for the pivots is connected directly to the piston-rod instead of through a bent arm and the swinging motion to the canting-arm is given by means of a spring.

The same parts are indicated by the same letters throughout the several views.

A represents the platform on which the timbers A^3 are supported, which timbers carry the tracks on which the sawmill-carriage B runs. This sawmill-carriage is provided with the knees B′, and the entire carriage is constructed in the ordinary or in any well-known way.

The platform A is partly supported on the uprights A′ and A^2, between which uprights A′ is or may be secured a cross-piece a', let into the timber or other support a. Near their upper ends these uprights A′ are faced with stout metal plates a^2.

C represents a long stationary cylinder, and D a short cylinder, also stationary, parallel to the first, and preferably placed in a vertical position. Each of these cylinders is provided with upwardly-projecting guides c and d for the piston-rods C′ and D′, which piston-rods carry cross-heads C^2 and D^2, provided with transverse pins c^5 and d^5. The piston-rods C′ and D′ may also be provided with suitable guides to insure their working in perfect line with their respective cylinders, as indicated in dotted lines at U in Fig. 6. The cross-head C^2 is provided with a central tongue c^3 or continuation of the piston-rod and two side tongues c^4, spaced at a short distance therefrom, between which tongues c^3 and c^4 are pivoted the ends of the two side bars E, which are pivotally connected, as at f, to the lower outer end of the loading-arm F. This loading-arm is represented in the form of an approximately triangular plate having ribbed or flanged edges, such as f^2; but this plate may be made in the form of a bent bar or bell-crank lever, constructed of any suitable material, if desired, although I prefer to have the said loading-arm in the form of a plate, in order to get the great rigidity and strength found in a deep plate, such as is shown. While I have shown two of these side bars E pivoted to the opposite sides of the plate F, a single forked bar may be used, if desired;

but in order to balance the strains I preferably use two bars, as shown.

At the forward corner of the loading arm or plate F the two vertical bars H are pivotally attached, as at f', while the lower ends of these bars are connected by means of the pin h' to the bosses k of the bent levers K. Instead of two of these bars H, one on either side of the loading-arm F, a single forked bar may be used, if desired. The bar or bars H have pivotally connected thereto, as at h^0, the radius-bar H′, which is pivoted at h^2 to the bracket a^3, which bracket is secured to any convenient post, as A^2. These bars H are held always in an approximately-vertical direction by the said radius-bar H′, the slight lateral motion of the said bars H, due to the the circular motion of the radius-bar, being immaterial and unobjectionable. Instead of the radius-bar, the bar or bars H may be arranged to move in vertical guides, if desired.

The angular levers K are provided with short arms k' and long arms k^2, which are approximately at right angles to each other, and both turn about the pivot h'. The short arms k' are pivotally connected to the pin d^5 on the cross-head D^2, and the longer arms are pivotally connected, as at k^0, to the two canting-arms M. These arms k^2 are inclined outward, as shown at Fig. 2, and the canting-arms M are spaced at some distance on either side of the loading-arm F, to enable them to operate between the head-blocks or each side of any one of them on the sawmill-carriage, and also to give sufficient distance between the supports when the log is lifted, as will be hereinafter described. These arms k^2 are connected by the bent brace k^3 and a rope K′, passing over a pulley K^2 and supporting a weight K^3, as shown at K^{30} in Fig. 7, or its equivalent spring may be used to swing the bar K to the right for quickly throwing the canting-arms beneath the saw-log, as will be hereinafter described. A timber-support a or other suitable stop, preferably faced with rubber or leather a^0, is placed in the proper position to check the downward movement of the pivot h', for the purpose of keeping the arms k^2 inclined backward slightly when the piston-rod D′ is at its lowest position.

In the form of device shown in Fig. 7 the bar K is made straight, and together with the bar H it is pivoted directly to the end of the piston-rod D′, the swinging motion of the canting-arm being secured by the spring K^{30}, which is the equivalent of the weight K^3, already described.

The canting-arms M are bent, as shown, and have their forward ends terminating in the rounded portion m, projecting somewhat beyond the biting edge m', to prevent the canting-arms from gouging into the bottom face of the log or cant, or from being dulled by or cutting into the plates a^2, as will be hereinafter described, while the rear ends of the said canting-arms are pivoted at m^2 to the bent bars P, which are connected together by the bent brace p, and at their lower ends are pivoted on the pins c^5 of the cross-head C^2. The free ends of the canting-arms M are preferably so adjusted as to be always at approximately right angles to the loading edge f^2 of the loading-arm F.

The cylinders C and D are adapted to cushion at the lower end of the stroke by inwardly-acting check-valves placed at Q^0, (see Figs. 1 and 2,) and are supplied with valves Q and Q′, which are provided with valve-stems q and q', connected by the system of bell-crank levers R, R′, R^2, and R^3 and the connecting-rods r, r', r^2, and r^3 with the levers S and S′, which are slotted, as at s, and pivoted, as at s'. The said levers S and S′ are set at approximately right angles to each other, as shown in Fig. 3, and are operated by the hand-rod T, which is suspended on a universal joint t, and is provided with a handle t' and with a weight t^2. By this system of levers and by an arrangement of valves well known in the art steam or other fluid pressure may be admitted to either end of either cylinder or to one end of one cylinder and the opposite end of the other, or vice versa, and thus the motions of the pistons in the two cylinders may be regulated at will by the operator at the handle t'.

X represents the log-deck upon which the logs W are placed ready for loading onto the sawmill-carriage.

The operation of the device will now be described in detail.

Since the pistons in the cylinders C and D may be forced up or down or held up or held down by means of admitting fluid-pressure into the proper end of the cylinder, in describing the operation of the apparatus it will be more convenient to refer merely to the motion of the piston-rods, it being understood that this motion is produced in the ordinary well-known way. The various parts being in the initial position, with the log rolled near the edge of the log-deck, as shown in Fig. 1, the piston-rod C′ is forced upward and the piston-rod D′ is held down in the lower position, with the pivot h' resting on the timber or other support a, the parts coming quickly to the position shown in full lines in Fig. 4. The further upward motion of the piston-rod C′ will force the loading-arm F around about its pivot f', which pivot will be held fast by the radius-bar H′ and the piston-rod D′, and the loading-arm will shove or roll the log toward the carriage. At the same time the nose of the canting-arms M will be lowered downward toward the plates a^2 until when the various parts reach the position shown in dotted lines in Fig. 4 the nose of the canting-arms will bear against the said plate a^2 and the log will be forced by the loading-arm against the face of the knees B′, all as shown in Fig. 4. Thus it will be seen that the canting-arms do not assist in the loading proper. The log after being loaded onto the sawmill-carriage is secured in place in the usual way

and a slab is sawed off, as shown at w in Fig. 5. In the meantime the loading and turning apparatus are brought back to the initial position shown in Fig. 1. Now after one side of the log has been slabbed and it is desired to work on the next face of the log the apparatus is brought to the position shown in the dotted lines in Fig. 4, as has already been described, and then the pistons C' and D' are both forced upward to the position shown in Fig. 5. The upward motion of the arms k^2 will shove the nose of the canting-arms clear of the plates a^2, when the motion of the short arms k' about the pivot h' will swing the end of the canting-arms rapidly between the head-blocks of the sawmill-carriage and beneath the sawlog to the position shown in Fig. 5. This rotary motion of the arms k^2 about the pivot h' will be accelerated by the weight K^3 or its equivalent spring; but neither the weight nor the spring may be used, if preferred, since the upward travel of the piston-rod D' will tend to swing the short arms k' and also the long arms k^2 about the pivot h', and the longer radius of the latter will cause a very little travel of the short arms to swing the free end of the long arms and the canting-levers carried thereby through the required distance laterally. When the parts are in the position shown in full lines in Fig. 5, keep the pressure on the piston-rod D' and pull down on the piston-rod C', when the log will be lifted up bodily to the position shown in dotted lines in Fig. 5, and by further lowering the loading-arm F the log may be laid on its slabbed side on the log-deck in approximately the position occupied by the log in Fig. 1, when by lowering the piston-rod D' the apparatus will return to the initial position, and the log may be shoved on the timber-carriage in the manner already described by reference to Fig. 4. In a similar way a log with two sides slabbed may be turned over to have its third side slabbed, and so on until all four of the sides of the log are slabbed; or a cant placed on the sawmill-carriage may be turned over approximately ninety degrees at a time until it is revolved through ninety degrees, one hundred and eighty degrees, two hundred and seventy degrees, three hundred and sixty degrees, &c.; but it will rarely be necessary to turn the log more than ninety degrees for a fresh cut, which can be done in one operation.

It frequently becomes necessary or desirable to turn a log through a small angle on the carriage to clear a knot from the knee or from the head-blocks or to avoid an imperfection in the log or for other reasons, and this may be done in the manner shown in Fig. 6, where the log being in place on the sawmill-carriage and the apparatus being in the position shown in Fig. 1 the piston-rod D' is pushed upward until the biting edge m' catches in the log, as shown in Fig. 6. Then keep pushing upward on the piston-rod D' until the canting-arm reaches the position shown in dotted lines, when it will disengage itself from the log owing to the round shape of the latter. If by this operation the knot w' is not removed clear of the knee B', the canting-arm may be drawn down again and then forced up a second time, again biting in the log and turning the same over through a small angle. In this manner a round log may be revolved through any desired angle without removing the same from the sawmill-carriage. By this method of turning the log toward the knees the bark or rough surface of the log only is engaged, and in a positive manner obviating most of the injuries due to the sharp teeth now most commonly used for this purpose.

It will be seen that this apparatus turns the log either toward or away from the knees, as may be desired. Moreover, the loading-arm operates on the log with a rapidly-decreasing motion, whereby the motion of the log slows down rapidly as it approaches the knees, while at the same time the power-arm increases, thus rendering it possible to stop the loading-arm entirely and then easily slide the log against the knees, thus avoiding accidents to the set works.

While I have shown steam-cylinders for operating the canting-arms and the loading-arm it will be obvious that any other suitable means of imparting reciprocating motion may be adopted. Moreover, it will be obvious that only one of the canting-arms may be used and two loading-arms or only a single canting-arm and a single loading-arm, or where extremely long and heavy logs are to be handled the apparatus may be duplicated at each end of the log-deck.

The herein-described mode of manipulating logs for the purposes set forth is believed to be broadly new, and it is my purpose to claim all equivalent means of accomplishing the same result in a substantially similar way.

The invention is believed to be a pioneer invention and is broadly claimed as such.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In an apparatus for turning logs on sawmill-carriages, a canting-arm pivoted mediate of its length, means for swinging the free end of said arm horizontally beneath the log on the carriage, for tilting said free end about said pivot to a vertical position, and for substantially vertically reciprocating said free end while in its vertical position and in engagement with the log, substantially as described.

2. An apparatus for loading and turning logs on sawmill-carriages comprising a loading-arm with a vertically-movable pivot therefor, and a canting-arm provided with a vertically and a laterally movable pivot, with means for moving the pivot of said loading-arm vertically and for swinging the said arm about its pivot, and means for raising and lowering the pivot of said canting-arm, for giving said pivot a distinct substantial lat-

eral movement, and for swinging the said canting-arm about said pivot, substantially as described.

3. In an apparatus for loading and turning logs on sawmill-carriages, the combination with a pivoted loading-arm and means for swinging the same about its pivot, of means for moving said pivot vertically, and a canting-arm with means for moving the same perpendicularly relative to said loading-arm and for holding said canting-arm at the desired angle relative to said loading-arm while the latter is swung about its pivot, substantially as described.

4. In an apparatus for turning logs on sawmill-carriages, a pivoted canting-arm and means for moving said arm into a substantially horizontal position and engaging the bottom of the log on the carriage, for tilting said arm on an axis substantially in the saw-line to cant the log and for reciprocating said arm substantially in the plane of the saw to rotate the log on its axis, substantially as described.

5. An apparatus for loading and turning logs on sawmill-carriages comprising a loading-arm with a vertically-movable pivot therefor, and a plurality of canting-arms provided with vertically and laterally movable pivots, with means for moving the pivot of said loading-arm vertically and for swinging the said arm about its pivot, and means for raising and lowering the pivots of said canting-arms, for giving said pivots a substantial lateral movement, and for swinging the said canting-arms about said pivots, substantially as described.

6. In an apparatus for loading and turning logs on sawmill-carriages, the combination with a pivoted loading-arm and means for swinging the same about its pivot, of means for moving said pivot vertically, and a plurality of canting-arms with means for moving the same perpendicularly relative to said loading-arm and for holding said canting-arms at the desired angle relative to said loading-arm while the latter is swung, bout its pivot, substantially as described.

7. An apparatus for loading and turning logs on sawmill-carriages, comprising a pivoted loading-arm adapted to press the logs toward the sawmill-carriage, and a pivoted canting-arm moving at right angles relative to said loading-arm and adapted to move horizontally beneath the log on the carriage, with common means for raising and lowering the pivots of both of said arms and for swinging said arms about their pivots, substantially as described.

8. An apparatus for loading and turning logs on sawmill-carriages, comprising a pivoted loading-arm adapted to press the logs toward the sawmill-carriage, and a plurality of pivoted canting-arms moving at right angles relative to said loading-arm and adapted to move horizontally beneath the log on the carriage, with common means for raising and lowering the pivots of said arms and for swinging said arms about their pivots, substantially as described.

9. An apparatus for loading and turning logs on sawmill-carriages comprising a loading-arm with a vertically-movable pivot therefor, and a canting-arm provided with a vertically and a laterally movable pivot and normally movable at approximately right angles to the face of said loading-arm, with means for moving the pivot of said loading-arm vertically and for swinging the said arm about its pivot, and means for raising and lowering the pivot of said canting-arm, for giving said pivot a distinct substantial lateral movement, and for swinging the said canting-arm about said pivot, substantially as described.

10. An apparatus for loading and turning logs on sawmill-carriages comprising a loading-arm with a vertically-movable pivot therefor, and a plurality of canting-arms each provided with a vertically and a laterally movable pivot and normally movable at approximately right angles to the face of said loading-arm, with means for moving the pivot of said loading-arm vertically and for swinging the said arm about its pivot, and means for raising and lowering the pivots of said canting-arms, for giving said arms a distinct and substantial lateral movement and for swinging the said canting-arms about said pivots, substantially as described.

11. In an apparatus for loading and turning logs on sawmill-carriages, the combination with a pivoted loading-arm and means for swinging the same about its pivot, of means for moving said pivot vertically, and a canting-arm normally moving at right angles to the face of said loading-arm, with means for moving the same perpendicularly relative to said loading-arm and for holding said canting-arm at the desired angle relative to said loading-arm while the latter is swung about its pivot, substantially as described.

12. In an apparatus for loading and turning logs on sawmill-carriages, the combination with a pivoted loading-arm and means for swinging the same about its pivot, of means for moving said pivot vertically, and a plurality of canting-arms normally moving at right angles to the face of said loading-arm, with means for moving the same perpendicularly relative to said loading-arm and for holding said canting-arms at the desired angle relative to said loading-arm while the latter is swung about its pivot, substantially as described.

13. In an apparatus for turning logs on sawmill-carriages, the combination with a canting-arm pivotally connected to the actuating means, of means for horizontally moving said arm beneath the log on the carriage, for moving vertically the pivot of said arm and for swinging said arm about said pivot, substantially as described.

14. In an apparatus for turning logs on sawmill-carriages, the combination with a pivoted

canting-arm bent at or near its pivot and provided with a rounded face and a biting edge at the free end thereof, the said rounded face projecting somewhat beyond the said biting edge on the end face of the canting-arm with means for swinging said free end beneath the log, and means for moving said pivot vertically and for swinging said arm about said pivot, substantially as described.

15. In an apparatus for turning logs on sawmill-carriages, the combination with a canting-arm bent as shown and provided with a vertically-movable pivot, of means for moving said pivot vertically and for imparting thereto a distinct and substantial lateral movement, and means for swinging said arm about said pivot, substantially as described.

16. An apparatus for turning logs on sawmill-carriages comprising a canting-arm provided mediate of its length with a vertically and a laterally movable pivot, with means for raising and lowering the pivot of said canting-arm, for swinging said pivot laterally, with a distinct and substantial movement and for moving the said canting-arm about said pivot, substantially as described.

17. An apparatus for turning logs on sawmill-carriages comprising a plurality of canting-arms provided mediate of their length with vertically and laterally movable pivots, with means for raising and lowering the pivots of said canting-arms, for moving said pivots laterally with a distinct and substantial movement, and for swinging the said canting-arms about said pivots, substantially as described.

18. An apparatus for turning logs on sawmill-carriages comprising a plurality of bent canting-arms provided mediate of their length with vertically and laterally movable pivots, the free end of said arms being provided with biting edges, with means for raising and lowering the pivots of said canting-arms, for moving said pivots laterally with a distinct and substantial movement and for swinging the said canting-arms about said pivots substantially as described.

19. In an apparatus for turning logs on sawmill-carriages, the combination with a canting-arm, of an angular lever provided with two legs, and a vertically-movable pivot, the upper leg being pivotally connected to said canting-arm, of means operating on the opposite leg of said angular lever for raising the pivot thereof, vertically, and for swinging said angular lever about said pivot, and means for swinging said canting-arm about its pivot, substantially as described.

20. In an apparatus for turning logs on sawmill-carriages, the combination with a canting-arm, of a vertically-movable support for said canting-arm forming the pivot thereof, means pivotally connected thereto for moving said support vertically and for moving the same laterally with a distinct and substantial movement, and means for swinging the said canting-arm about said pivot, substantially as described.

21. In an apparatus for turning logs on sawmill-carriages, the combination with a plurality of canting-arms, of vertically-movable supports for said canting-arms, which supports form the pivots for said canting-arms, of means pivotally connected thereto for moving said supports vertically and for moving the same laterally with a distinct and substantial movement, and means for swinging said canting-arms about said pivots, substantially as described.

22. In an apparatus for turning logs on sawmill-carriages, the combination with a plurality of canting-arms, of a plurality of angular levers each provided with two legs and a vertically-movable pivot, the upper legs being pivotally connected to said canting-arms, of means for exerting an upward pressure on the lower legs, of said angular levers adapted to raise the pivot thereof vertically, and to swing said angular levers about said pivots and means for swinging said canting-arms about their pivots, substantially as described.

23. In an apparatus for turning logs on sawmill-carriages, the combination, of a canting-arm, a vertically-movable support for said canting-arm and forming the pivot thereof, means for moving said support vertically, means for moving the said support laterally with a distinct and substantial movement and means for preventing the canting-arm swinging beyond the saw-line until it is above the level of the carriage-timbers, substantially as described.

24. In an apparatus for turning logs on sawmill-carriages, the combination with a frame supporting the sawmill-carriage, and a plurality of plates fast to said frame, of a plurality of canting-arms, vertically-movable supports for said canting-arms and forming the pivots thereof, means for holding the face of said canting-arms against the said plates during a portion of the upward travel of said supports, and for swinging the said supports laterally when the free ends of said canting-arms pass above said plates, substantially as described.

25. In an apparatus for turning logs on sawmill-carriages, the combination with a frame supporting the sawmill-carriage, and a plate fast to said frame, of a canting-arm, an angular lever provided with two legs, and a vertically-movable pivot, the upper leg being pivotally connected to said canting-arm and forming the pivot thereof, of means for exerting an upward pressure on the lower leg of said angular lever, causing said canting-arm to bear against said plate during a portion of the upward travel of said angular lever, and to swing laterally above said plate when the free end of said canting-arm passes said plate, with means for swinging said canting-arm about its pivot, substantially as described.

26. In an apparatus for turning logs on sawmill-carriages, the combination with a frame supporting the sawmill-carriage, and a plate fast to said frame, of a canting-arm having a rounded face and a biting edge beneath the same, an angular lever provided with two legs, and a vertically-movable pivot, the upper leg being pivotally connected to said canting-arm and forming the pivot thereof, of means for exerting an upward pressure on the lower leg of said angular lever, causing the rounded face of said canting-arm to bear against said plate during a portion of the upward travel of said angular lever, and to swing laterally above said plate when the free end of said canting-arm passes said plate, with means for swinging said canting-arm about its pivot, substantially as described.

27. In an apparatus for turning logs on sawmill-carriages, the combination with a frame supporting the sawmill-carriage, and a plate fast to said frame, of a canting-arm, an angular lever provided with a long upper and a short lower leg and a vertically-movable pivot, the upper leg being pivotally connected to said canting-arm and forming the pivot thereof, of means for exerting an upward pressure on the short lower leg of said angular lever, causing said canting-arm to bear against said plate during a portion of the upward travel of said angular lever, and to swing rapidly laterally above said plate when the free end of said canting-arm passes said plate, and means for swinging said canting-arm about its pivot, substantially as described.

28. In an apparatus for turning logs on sawmill-carriages, the combination with a canting-arm, of an angular lever provided with one long and one short leg, and a vertically-movable pivot, the long leg being pivotally connected to said canting-arm, of means operating on the short leg of said angular lever for raising the pivot thereof vertically, and for swinging said angular lever about said pivot, and means for checking the motion of said angular lever about its pivot until said canting-arm has reached a predetermined height, substantially as described.

29. In an apparatus for turning logs on sawmill-carriages, the combination with a plurality of canting-arms, of a plurality of angular levers each provided with a long and a short leg, and a vertically-movable pivot, the long legs being pivotally connected to said canting-arms, of means for exerting an upward pressure on the short legs of said angular levers adapted to raise the pivots thereof vertically, and to swing said angular levers about said pivots, means for checking the motion of said angular levers about their pivots until said canting-arms have reached a predetermined height, and means for swinging said canting-arms about their pivots, substantially as described.

30. In an apparatus for turning logs on sawmill-carriages, the combination with a frame supporting the sawmill-carriage, and a plate fast to said frame, of a canting-arm, a vertical support therefor forming the pivot of said canting-arm, means for holding the face of said canting-arm against said plate during a portion of the upward travel of said support, and for swinging said support laterally when the fore end of said canting-arm passes above said plate, and means for swinging said canting-arm about its pivot, substantially as described.

31. In an apparatus of the character described, a log-engaging arm having two independently-movable supports, to each of which it is so connected as to move upon either as the other is independently moved, means for independently or simultaneously moving either support vertically and for giving the said supports substantial lateral movement, substantially as described.

32. In an apparatus of the character described, the combination of a log-engaging arm having two independently-movable supports, to each of which it is so connected as to move upon either as the other support is independently moved, means for independently or simultaneously moving either support vertically and for giving the said supports a distinct lateral movement, with a pivoted log-loading arm, and means for rotating said loading-arm about its pivot, substantially as described.

33. In an apparatus of the character described, the combination of a canting-arm having two independently-movable supports, to each of which it is so connected as to move upon either support as the other is independently moved, means for independently or simultaneously moving either support vertically and for giving said supports a distinct and substantial lateral movement, with a loading-arm provided with a vertical movable pivot, and means for swinging said loading-arm about said pivot, substantially as described.

34. In an apparatus of the character described, the combination with a canting-arm having two independently-movable supports, to each of which it is so connected as to move upon either support as the other is independently moved, means for independently or simultaneously moving either support vertically, and for giving said supports a distinct and substantial lateral movement, of a loading-arm provided with a vertically-movable pivot, with means for moving the same simultaneously with one of the movable supports for the canting-arm, and means for swinging said loading-arm about its pivot, substantially as described.

35. In an apparatus for loading logs on sawmill-carriages, the combination with a loading-arm, of an approximately vertical bar or bars forming a support pivotally connected to said loading-arm and forming the pivot thereof, a radius-bar pivotally connected to said supporting bar or bars at some distance from the piston-rod and holding the said bar

or bars in an approximately vertical position, a stationary cylinder with piston-rod and connections for raising and lowering said support, and means for swinging said loading-arm about its pivot from its normal position in the log-deck to a position in the plane of the saw, substantially as described.

36. In an apparatus for loading logs on sawmill-carriages, the combination with a loading-arm, of an approximately vertical bar or bars forming a support pivotally connected to said loading-arm and forming the pivot thereof, a radius-bar pivotally connected to said supporting bar or bars at some distance from the piston-rod and holding said bar or bars in an approximately vertical position, a stationary cylinder with piston-rod and connections for raising and lowering said support, and a second cylinder with piston-rod and connections for swinging said loading-arm about its pivot from its normal position in the log-deck to a position in the plane of the saw, substantially as described.

37. An apparatus for loading and turning logs on sawmill-carriages comprising a loading-arm with a vertically-movable pivot therefor, and a canting-arm provided with a vertically and a laterally movable pivot and normally movable at approximately right angles to the face of said loading-arm, with means for moving the pivot of said loading-arm vertically and for swinging the said arm about its pivot in one direction, and means for simultaneously raising or lowering the pivots of said canting-arm and said loading-arm, means for swinging said canting-arm pivot laterally, and means for swinging the said canting-arm about said pivot in the opposite direction to the motion of said loading-arm, substantially as described.

38. In an apparatus for loading and turning logs on sawmill-carriages, the combination with a pivoted canting-arm bent at or near its pivot and provided with a rounded face and a biting edge at the free end thereof with means for swinging said free end beneath the log, means for moving said pivot vertically and for swinging said arm about said pivot, and a loading-arm with means for moving the same in a constant angular relation to said canting-arm, substantially as described.

39. In an apparatus for loading and turning logs on sawmill-carriages, the combination with a frame supporting the sawmill-carriage, and a plate fast to said frame, of a canting-arm, an angular lever provided with two legs, and a vertically-movable pivot, the upper leg being pivotally connected to said canting-arm and forming the pivot thereof, of means for exerting an upward pressure on the lower leg of said angular lever, causing said canting-arm to bear against said plate during a portion of the upward travel of said angular lever, and to swing laterally above said plate when the free end of said canting-arm passes said plate, with means for swinging said canting-arm about its pivot, a loading-arm provided with a vertically-movable pivot, and means for swinging said loading-arm about its pivot, substantially as described.

40. In an apparatus for loading and turning logs on sawmill-carriages, the combination with a frame supporting the sawmill-carriage, and a plate fast to said frame, of a canting-arm having a rounded face and a biting edge beneath the same, an angular lever provided with two legs, and a vertically-movable pivot, the upper leg being pivotally connected to said canting-arm and forming the pivot thereof, of means for exerting an upward pressure on the lower leg of said angular lever, causing the rounded face of said canting-arm to bear against said plate during a portion of the upward travel of said angular lever, and to swing laterally above said plate when the free end of said canting-arm passes said plate, with means for swinging said canting-arm about its pivot, a loading-arm provided with a vertically-movable pivot, and means for swinging said arm about its pivot, substantially as described.

41. In an apparatus for loading and turning logs on sawmill-carriages, the combination with a frame supporting the sawmill-carriage, and a plate fast to said frame, of a canting-arm, an angular lever provided with a long upper and a short lower leg and a vertically-movable pivot, the upper leg being pivotally connected to said canting-arm and forming the pivot thereof, of means for exerting an upward pressure on the short lower leg of said angular lever, causing said canting-arm to bear against said plate during a portion of the upward travel of said angular lever, and to swing rapidly laterally above said plate when the free end of said canting-arm passes said plate, and means for swinging said canting-arm about its pivot, a loading-arm provided with a vertically-movable pivot, and means for swinging said arm about said pivot, substantially as described.

42. In an apparatus for loading and turning logs on sawmill-carriages, the combination with a canting-arm, of an angular lever provided with one long and one short leg, and a vertically-movable pivot, the long leg being pivotally connected to said canting-arm, of means operating on the short leg of said angular lever for raising the pivot thereof vertically, and for swinging said angular lever about said pivot, and means for checking the motion of said angular lever about its pivot until said canting-arm has reached a predetermined height, a loading-arm provided with a vertically-movable pivot, and means for swinging said arm about its pivot, substantially as described.

43. In an apparatus for loading logs on sawmill-carriages, the combination with a loading-arm and a separate canting-arm, of a support pivotally connected to said loading-arm and forming the pivot thereof, and an independent support pivotally connected to said

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canting-arm and forming the pivot thereof, a stationary cylinder with piston-rod and connections for raising and lowering both of said supports, and means for swinging both of said arms about their pivots, substantially as described.

44. In an apparatus for loading logs on sawmill-carriages, the combination with a loading-arm, and a separate canting-arm, of a support pivotally connected to said loading-arm and forming the pivot thereof, and an independent support pivotally connected to said canting-arm and forming the pivot thereof, a stationary cylinder with piston-rod and connections for raising and lowering both of said supports, and a second cylinder with piston-rod and connections for swinging both of said arms about their pivots, substantially as described.

45. In an apparatus for loading and turning logs on sawmill-carriages, the combination with a V-shaped plate, of a support pivotally connected to said plate at or near the apex thereof, a bent canting-arm, and a support vertically connected thereto and forming the pivot thereof, a cylinder with piston-rod and connections adapted to raise and lower both of said supports, and a second cylinder with piston-rod and connections adapted to swing both said plate and said canting-arm about their pivots, substantially as described.

46. In an apparatus for loading logs on sawmill-carriages, the combination with a loading-arm, of an approximately vertical bar or bars forming a support pivotally connected to said loading-arm and forming the pivot thereof, a radius-bar pivotally connected to said supporting bar or bars and holding the same in an approximately vertical position, a canting-arm with a vertically-movable support forming a pivot therefor, a stationary cylinder with piston-rod and connections for raising and lowering both of said supports, and means for swinging both of said arms about their pivots, substantially as described.

47. In an apparatus for loading logs on sawmill-carriages, the combination with a loading-arm, of an approximately vertical bar or bars forming a support pivotally connected to said loading-arm and forming the pivot thereof, a radius-bar pivotally connected to said supporting bar or bars and holding the same in an approximately vertical position, a canting-arm with a vertically-movable support forming a pivot therefor, a stationary cylinder with piston-rod and connections for raising and lowering both of said supports, and a second cylinder with piston-rod and connections for swinging both of said arms about their pivots, substantially as described.

48. In a log loading and turning apparatus, the combination with a pivoted loading-arm and a pivoted canting-arm, of two stationary cylinders, with means operated by one of the said cylinders for raising or lowering the pivots of both of said arms, and means operated by the other cylinder for swinging both of said arms about their pivots, substantially as described.

49. In a log loading and turning apparatus, the combination with a pivoted loading-arm and a pivoted canting-arm, of a reciprocating part and means operated thereby for raising or lowering the pivots of both arms, and a second reciprocating part and means operated thereby for swinging both of said arms about their pivots, substantially as described.

50. In a log loading and turning apparatus, the combination with a pivoted loading-arm and a plurality of pivoted canting-arms, of a reciprocating part and means operated thereby for raising or lowering the pivots of all of said arms, and a second reciprocating part and means operated thereby for swinging all of said arms about their pivots, substantially as described.

51. In an apparatus for loading and turning logs on sawmill-carriages, the combination of the loading-arm F, the canting-arms M, the vertical bars H, the side bars E, the bent bars P, the radius-bar H′, the rope with weight K^3, the guide-rod U, the steam-cylinders C and D, with their valves Q and Q′, the operating hand-rod T, with its pivot, crank-arms and connecting-rods in pivots, all connected and operating together, as and for the purposes described.

In testimony whereof I affix my signature in presence of two witnesses.

PETER McNERNEY.

Witnesses:
AMOS HOLGATE,
HATTIE E. TAYLOR.

No. 623,002.

Patented Apr. 11, 1899.

E. E. FITZGERALD.

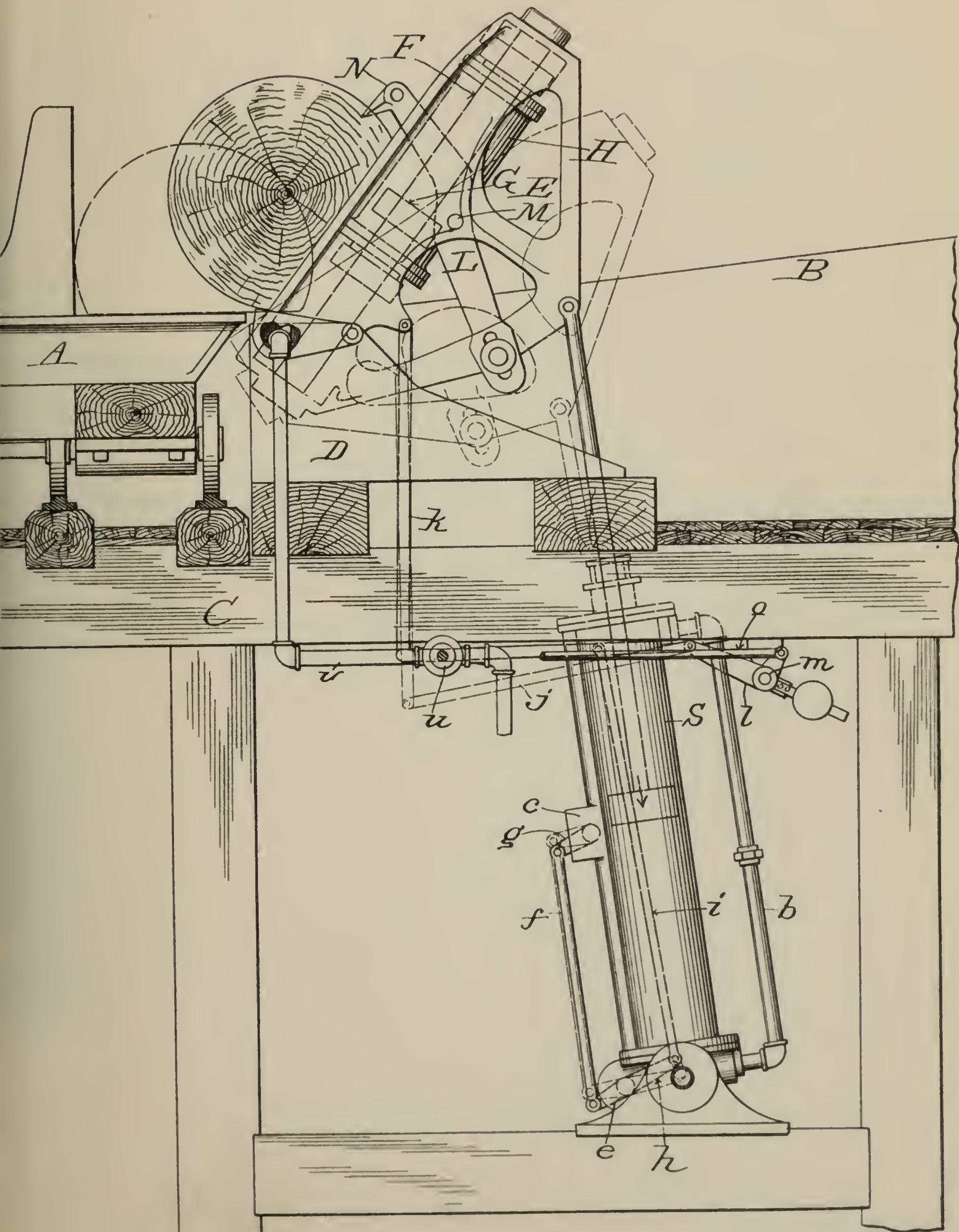
LOG CANTER.

(Application filed May 24, 1897.)

(No Model.)

5 Sheets—Sheet 1.

Fig. 1.



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Att'ys.

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E. E. FITZGERALD.

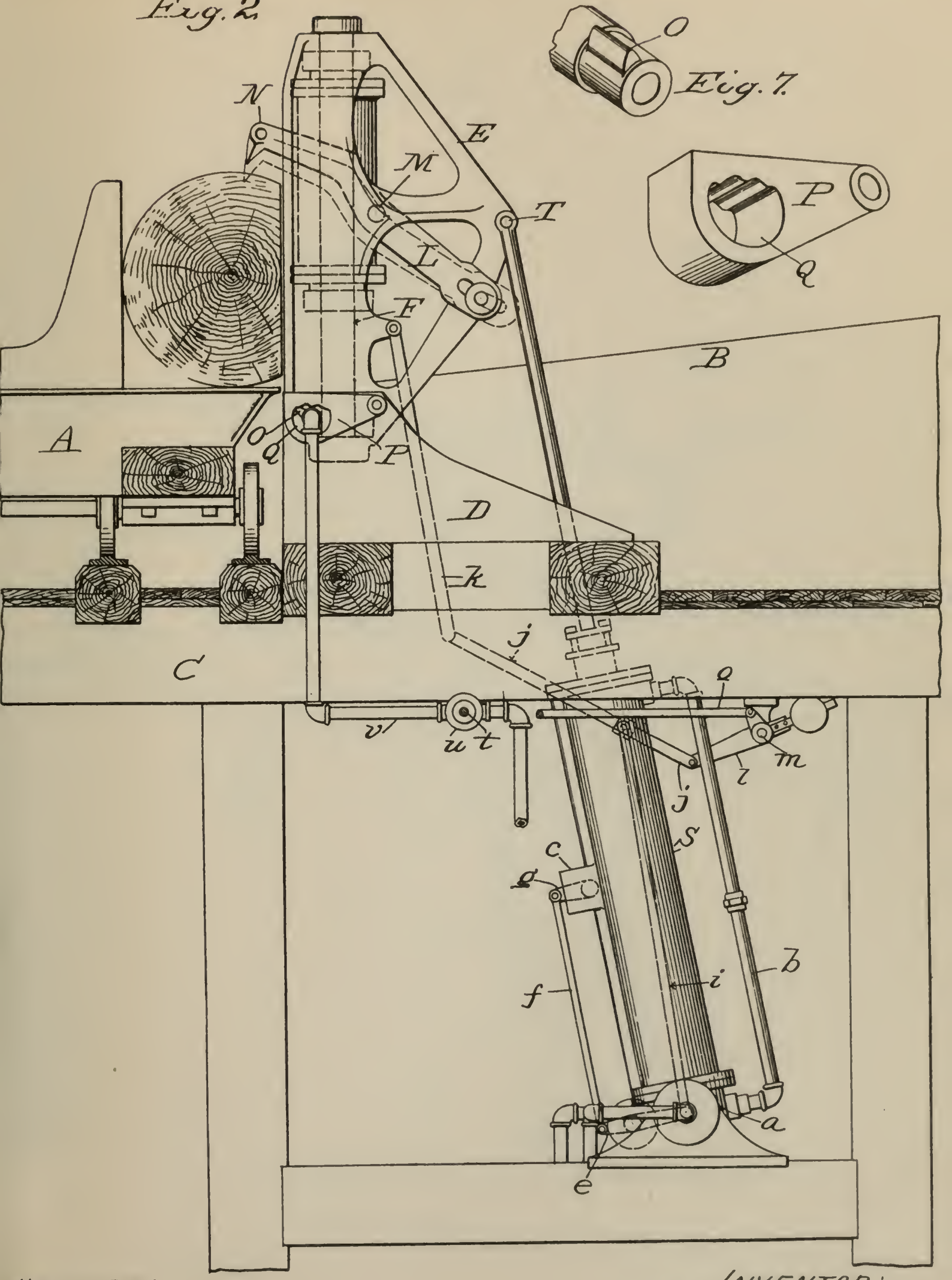
LOG CANTER.

(Application filed May 24, 1897.)

(No Model.) 5 Sheets—Sheet 2.

Fig. 2.

Fig. 7.



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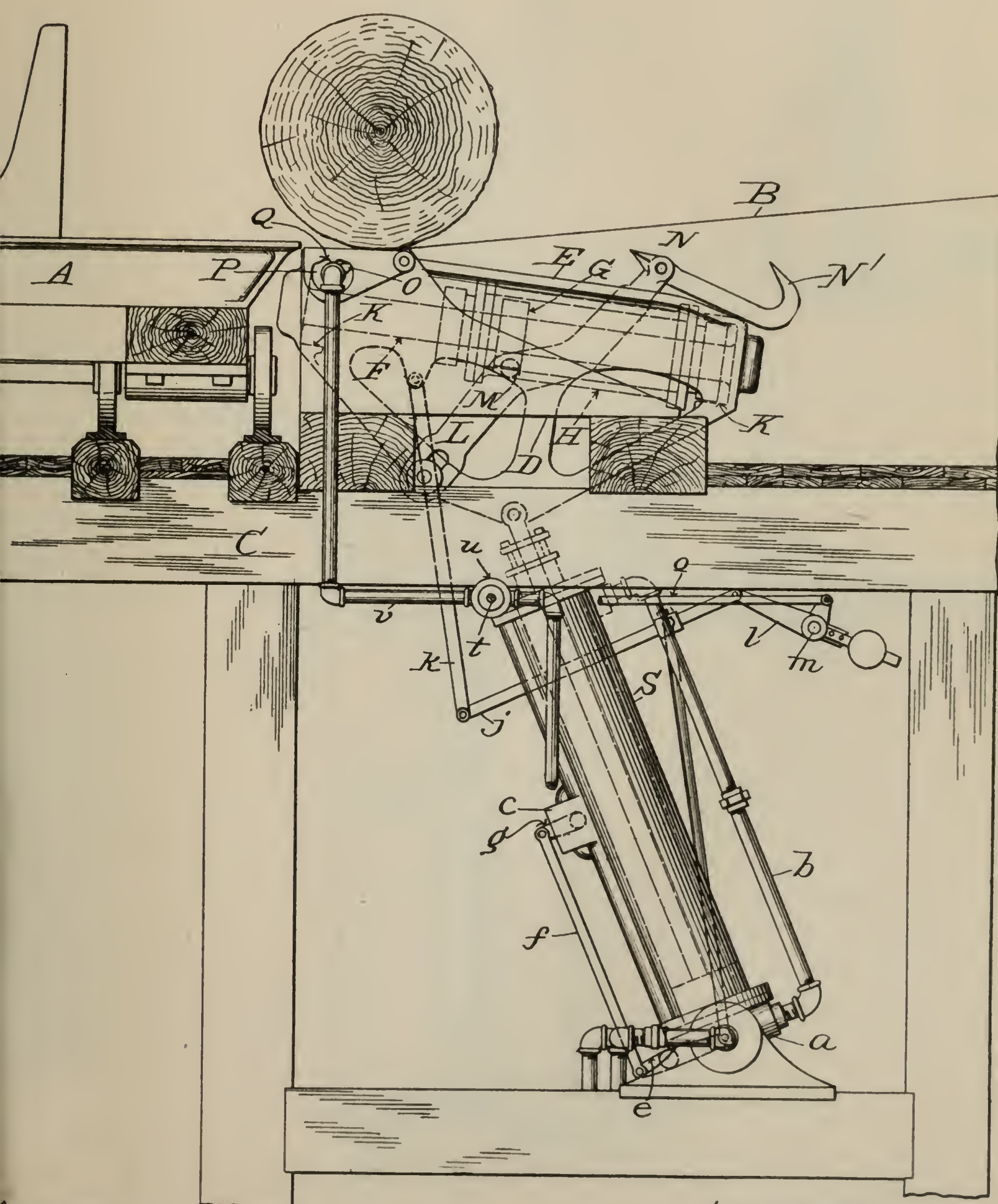
5 Sheets—Sheet 3.

Fig. 3



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(No Model.) 5 Sheets—Sheet 4.

Fig. 4.

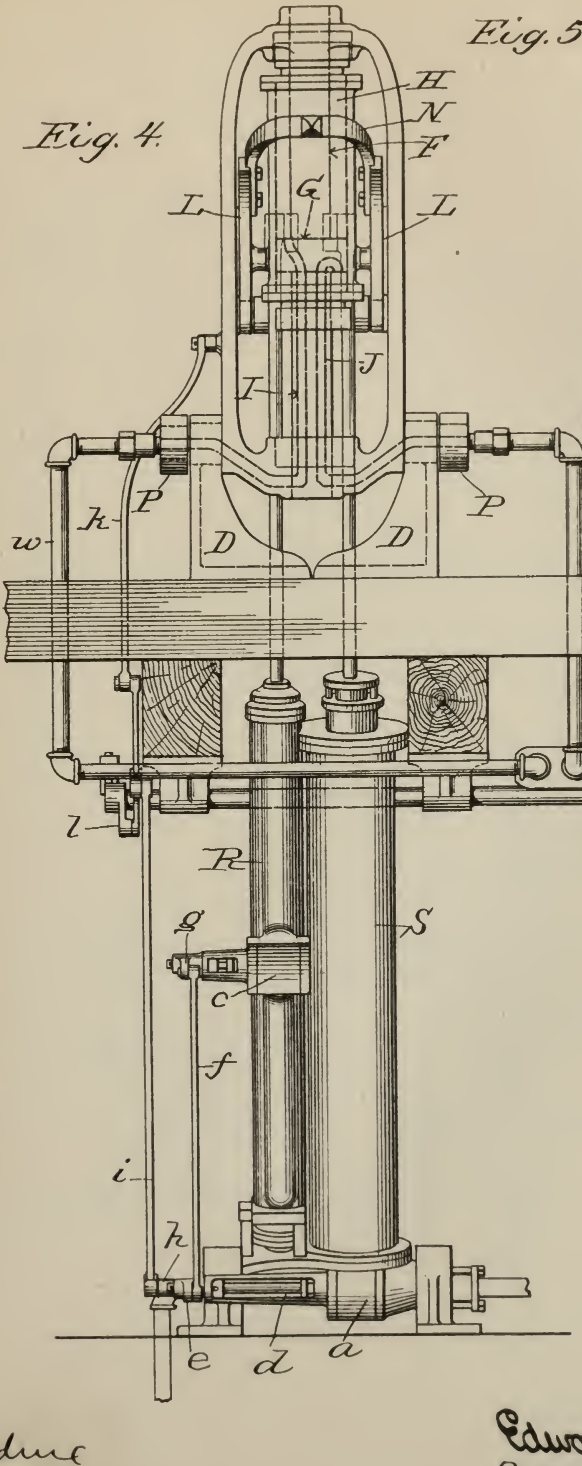
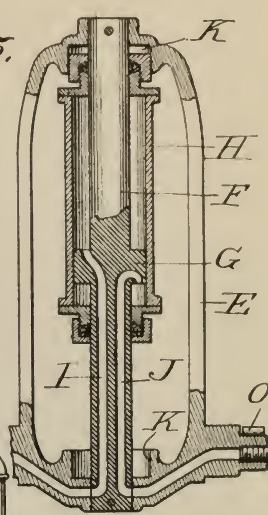


Fig. 5.



TTEST;

R. C. Burdine

D. E. Burdine

INVENTOR;

Edward E. Fitzgerald

BY Dodge and Sons,

ATTYS.

No. 623,002. Patented Apr. 11, 1899.

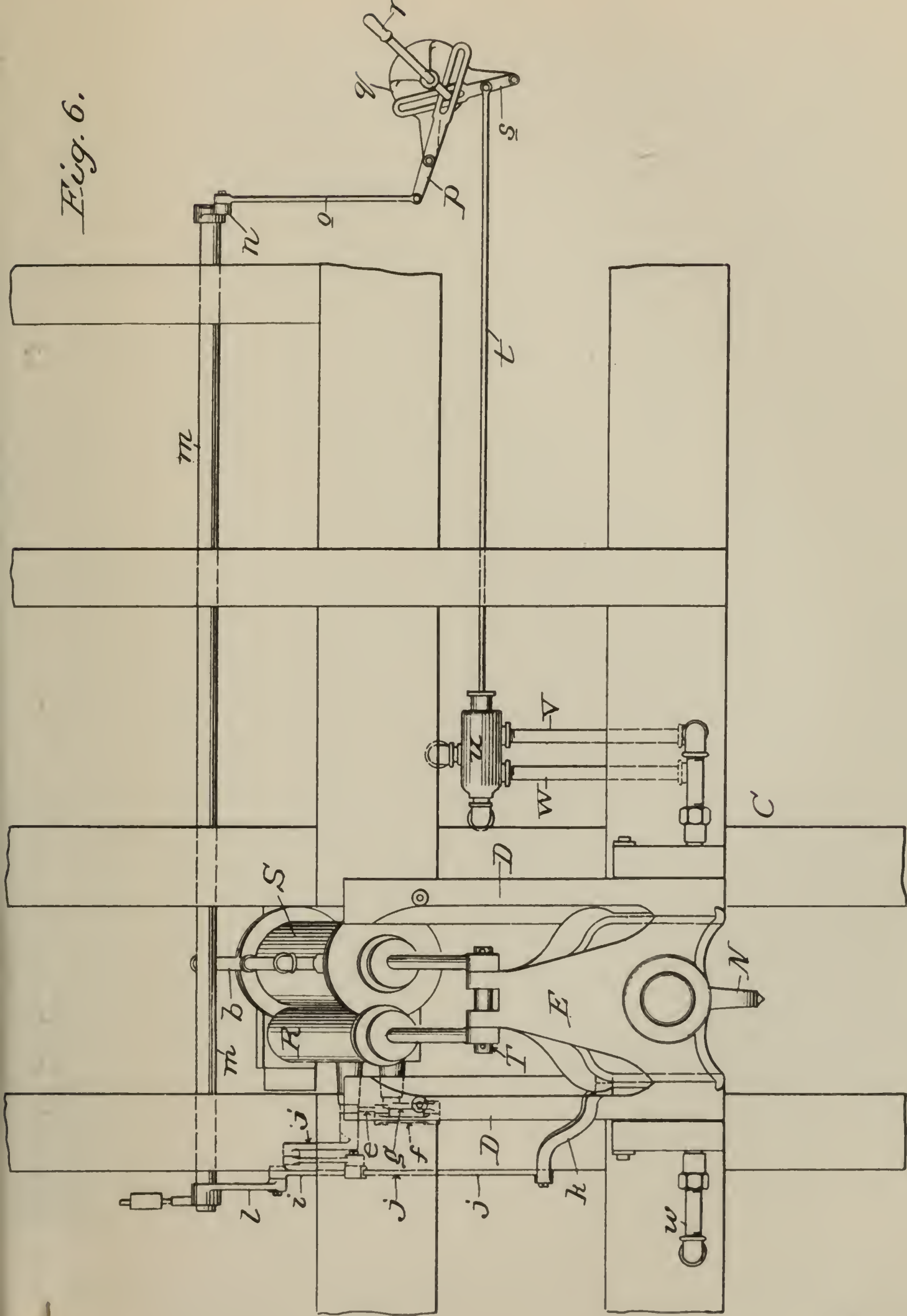
E. E. FITZGERALD.

LOG CANTER.

(Application filed May 24, 1897.)

(No Model.) 5 Sheets—Sheet 5.

Fig. 6.



Attest

[illegible] Burdine.

[illegible] Burdine.

Inventor;

Edward E. Fitzgerald,

by Dodge and Sons,

Att'ys

UNITED STATES PATENT OFFICE.

EDWARD EUGENE FITZGERALD, OF MILWAUKEE, WISCONSIN, ASSIGNOR OF ONE-HALF TO THE EDWARD P. ALLIS COMPANY, OF SAME PLACE.

LOG-CANTER.

SPECIFICATION forming part of Letters Patent No. 623,002, dated April 11, 1899.

Application filed May 24, 1897. Serial No. 637,927. (No model.)

To all whom it may concern:

Be it known that I, EDWARD EUGENE FITZGERALD, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Log-Canters, of which the following is a specification.

My present invention relates to log-canters, the operation and advantages of which will be hereinafter set forth, reference being had to the annexed drawings, wherein—

Figures 1, 2, and 3 are side elevations of the canter, shown in its proper relation to the log deck and carriage, the parts being in different working positions in the various views; Fig. 4, a fr nt elevation; Fig. 5, an enlarged sectional view showing certain details of construction; Fig. 6, a top plan view, and Fig. 7 an enlarged perspective view illustrative of certain details.

One object of my invention, among others, is to produce a canter by which the log is turned away from the knees in the act of turning.

A further advantage resides in the fact that by the construction employed the log as it balances over or turns over falls upon the canter-frame, which, being steam-actuated, forms, as it were, a steam-cushion for the log. By this arrangement the log does not fall upon the carriage or upon the log-deck, as is usual.

Another advantage is present in the fact that the same movement which operates the hook also turns the log, thereby saving time over those constructions wherein the log is first removed from the carriage and then turned.

Other advantages are also present and will appear in the following description.

Referring to Figs. 1, 2, and 3, A denotes the carriage, and B the log deck or way, supported upon suitable framing C. At and below the end of the log-deck adjacent to the carriage is secured a frame D, in which is journaled a frame E in a manner to be presently explained.

Frame E has mounted within it a piston-rod F, formed with a piston G, and a cylinder H is mounted upon and works upon said rod, steam-inlets I and J extending through the rod and communicating, respectively, with the upper and lower spaces above the piston. The trunnions of frame E, working in frame D, are hollow, and the passages thus formed connect the passages I and J with suitable steam-pipes, which are connected to the trunnions by packed swiveled couplings.

Upon reference to Fig. 5 it will be noted that the upper and lower ends of frame E are provided with annular recesses K, which, in conjunction with the packing-nuts on the heads of the cylinder, form air-cushions for the cylinder at the end of its stroke as it moves up or down.

The frame E extends rearwardly, and at a point below its center there is pivoted to it at each side an arm L, which arms extend upward in a forward direction and are journaled upon the cylinder at M. To the ends of said arms is bolted or otherwise securely fastened a hook N, which extends out over the log on the carriage when the parts are in the position indicated in Fig. 2. The rear ends of arms L are slotted, as shown, so that the point of the hook as the cylinder descends may be drawn in toward the front face of frame E.

When operating upon logs of large diameter, it may sometimes be necessary to employ a hook of longer reach or throw, and to this end there is pivoted to the end hook N a supplemental hook N', as shown in Fig. 1 of the drawings. When not in use, this hook may be removed or thrown back out of the way.

The trunnions of frame E, as will be seen upon reference to Figs. 5 and 7, are formed with lugs or projections O. To each side of frame D are pivoted blocks P of the form shown in Figs. 1, 2, 3, and 7. These blocks are formed with a flat upper face and with a transverse opening Q, the upper side of which is cam-shaped, as shown. The lugs O of the trunnions work against these cam-surfaces as the frame E is turned upon its bearings and the blocks are raised and lowered, forming a support for the lower face or side of the log when it is being withdrawn from the carriage by the hook to be turned. The blocks are so pivoted to the supporting-frame D that they normally are below the log-deck and do not interfere with the pas-

sage of the logs from the deck to the carriage. (See Fig. 3.)

Beneath the log-deck and in line with the frame E are pivoted two cylinders, an oil-cylinder R and a steam-cylinder S, the cylinders being connected and pivoted in the same frame or base, as shown in Fig. 4. The piston-rods of these cylinders are connected to the frame E at its rear by a pin T, so that both piston-rods must move in unison.

At the base of the steam-cylinder there is provided a valve *a* to control the inlet of steam to said piston, the steam passing directly from the valve into the lower part beneath the piston and through a pipe *b* from the valve to the upper part of the piston, according as the valve is open to one or the other of said inlets. The oil-cylinder is provided midway of its length with a valve *c* to permit the oil to pass from one end of the cylinder to the other, and thus allow the piston to move or to stop the flow of the oil, and thus stop the piston in its travel.

The stem *d* of the steam-valve *a* is connected through a rocker-arm *e*, link *f*, and rocker-arm *g* to the oil-valve *c*, the valves being arranged to open and close in unison.

To the outer end of valve-stem *d* there is secured another rocker-arm *h*, which is connected by link *i* to rod *j*, said rod *j* being in turn connected at its forward end to a rod *k*, pivotally connected to frame E. Rod *j* at its rear end is connected to an arm *l*, secured upon a counterweighted cross-shaft *m*, secured beneath the framing C. Cross-shaft *m* at its opposite end is connected through arm *n* and link *o* to a slotted arm *p*, pivoted upon a stand *q*. A hand-lever *r* is mounted in said stand and in such manner that it has a universal movement, the lower end of the lever passing through the slot in arm *p* and into a slot formed in an arm *s*, also pivoted upon the stand *q*. Extending from said arm *s* is a rod *t*, which controls the valve *u*, admitting steam to the upper cylinder H through pipes *v* and *w*.

It will be noted upon reference to Fig. 6 that the arms *p* and *s* stand at approximately right angles to each other, so that by a right line movement of the lever either one of the arms may be moved without affecting the other, while if the lever be turned in a circular path both arms may be moved simultaneously and the machine caused to go through one complete operation. In other words, by moving the lever in a plane through the slot of one arm it will serve to operate the other arm *p* or *s*, as the case may be, or by moving the lever coincident with the surface of a cone, thus crossing the planes through both slots of the arms *p* and *s*, both arms will be moved simultaneously.

Assuming the parts to be in the position indicated in Fig. 3, in which relation steam is shut off both from the lower and upper pistons, the valve *c* of the oil-cylinder is closed so that no oil can pass therethrough. A log is then rolled down the logway onto the carriage and a cut or any desired number of cuts are made. After this the operator by movement of the hand-lever *r* moves arm *p* and through the connections above set forth admits steam to cylinder S below the piston. The valve in the oil-cylinder is also opened to the same degree as the steam-valve, and frame E is forced upward into the position indicated in Fig. 2. If the lever *r* be moved in a right line only, the lower cylinder alone will be affected and the frame will be raised quickly or slowly, according to the extent to which the valves are opened. When the frame reaches its vertical position, the steam will be automatically cut off through the connections *i*, *j*, *k*, and *l* with shaft *m*, but not until the parts have passed from the position indicated in Fig. 3 to that indicated in Fig. 2. While the frame is moving into the vertical, the operator by a further movement of the lever in a line, so as to act upon arm *s*, admits steam into cylinder H, causing the hook to descend and enter the log, when by a further movement of lever *r* in a circular path steam will be admitted in the upper end of cylinder S and the frame drawn down. In turning, lugs O, acting upon block P, will throw said blocks upwardly into the position denoted in Fig. 1, thereby forming a support for the lower side of the log. As the log is turned away from the carriage and knees it rests bodily against the frame and upon the block and the descent of the frame and cylinder is regulated or checked by the oil in the oil-cylinder. When the frame reaches the position indicated in dotted lines in Fig. 1, the blocks P are withdrawn from beneath the log and the hook, acting on the upper part of the log, forces it over onto the carriage, the packing-nut on the lower end of the cylinder H entering the annular chamber K and checking the cylinder in its downward movement. So soon as the log is in its place upon the carriage steam is admitted above piston G, thus elevating cylinder H and hook N into position to again operate upon the log.

Through the connections of the valves and the controlling-lever, as above set forth, the movements of the machine are in a sense independent of the movement of the lever after the machine has once been started—that is to say, the frame will move entirely up or down unless arrested and then automatically come to a stop, the valve being what is known as a "floating" valve.

If it be desired to move the frame quickly, all that is necessary is to give the lever a full throw, opening the steam-valves to their full extent and also opening the oil-check valve to a like degree, thereby permitting the steam to act with its full force and effect. Ordinarily, however, steam is admitted gradually, and the piston in the lower cylinder can move only as fast as the oil in the oil-cylinder can pass from one side to the other, and when the machine comes to a stop the steam is pre-

vented from working expansively by the oil-check.

As before stated, one complete revolution of the controlling-lever will cause the frame to ascend to the vertical, the hook to engage the log, the frame to swing back, carrying the log with it, the log to be turned and placed flat face down upon the carriage, and finally the hook to ascend ready to again engage the log.

By shifting the pivotal connection of link *i* along the link *j* the point at which the valves will close can be regulated as desired.

When the log is first rolled upon the carriage and the frame is in a horizontal position, the log may, if necessary, be crowded up against the knee by simply admitting steam above piston G, causing the hook to press the log forward, thereby answering the purposes of a log-loader.

Having thus described my invention, what I claim is—

1. In a log-canter, the combination of a working cylinder and its piston and piston-rod; an oil-check cylinder and its piston and piston-rod; a canter-frame; and a common connection between said frame, and the piston-rods.

2. In a log-canter, the combination of a working cylinder, and its piston and piston-rod; an oil-check cylinder, and its piston and piston-rod; a canter-frame; a common point of connection between said frame and the piston-rods; valves for said pistons; and means for moving said valves in unison.

3. In a log-canter, the combination of a working cylinder, and its piston and piston-rod; an oil-check cylinder, and its piston and piston-rod; a canter-frame; a common point of connection between said frame and the piston-rods; valves for said pistons; connections between said valves to move them in unison; and connections between said valve connections and the canter-frame.

4. In a log-canter, the combination of a pivoted canter-frame; a hook carried thereby; means for operating said hook also carried by the frame; a power-cylinder for actuating the canter-frame; and means for admitting steam to said cylinder and to the hook-actuating mechanism, said means being so arranged that parts may be actuated simultaneously or independently.

5. In a log-canter, the combination of a pivoted canter-frame; a piston carried thereby; a hook adapted to be actuated by said piston; a power-cylinder for actuating the canter-frame; and means for controlling the actuation of the pistons independently or simultaneously.

6. In a log-canter, the combination of a pivoted canter-frame; a cylinder carried thereby; a hook adapted to be actuated thereby; a power-cylinder for actuating the canter-frame; and means for actuating the cylinders.

7. In a log-canter, the combination of a pivoted canter-frame; means for raising and lowering it; a hook pivoted to the frame; and a power-cylinder carried by the frame for actuating the hook.

8. In a log-canter, the combination of a pivoted canter-frame; means for raising and lowering it; a hook pivoted to the frame; a power-cylinder carried by the frame for actuating the hook; and air-chambers formed in the frame for receiving the cylinder at the ends of its stroke.

9. In a log-canter, the combination of a pivoted canter-frame; a hook provided with a slotted rear end; a pivot-pin extending from the frame through said slot; and means carried by the frame and moving in a line approximately parallel to the face thereof for raising and lowering the hook, substantially as described.

10. In a log-canter, the combination of a pivoted canter-frame; a hook provided with a slot at or near its rear end; a pivot-pin extending from the frame through said slot; means carried by the frame and moving in a line approximately parallel to the face thereof for raising and lowering the hook; and a supplemental or extension hook pivoted to the outer end of the pivoted hook, substantially as and for the purpose described.

11. In a log-canter, the combination of a pivoted canter-frame; a piston-rod provided with a piston secured within said frame; a cylinder mounted upon and designed to be traversed back and forth upon the rod; and a hook pivoted to the frame and connected to the cylinder.

12. In a log-canter, the combination of a pivoted canter-frame; a piston-rod provided with a piston mounted therein; a cylinder mounted upon and designed to be traversed upon said rod; a hook pivoted to the frame and connected to the cylinder, and steam-inlets extending through the rod and discharging respectively above and below the piston.

13. In a log-canter, the combination of a pivoted canter-frame provided with extended trunnions; lugs upon said trunnions; and blocks pivoted upon the frame-support in rear of the trunnions, provided with cam-shaped recesses designed to fit over the trunnions and lugs and to act in conjunction therewith, to elevate the forward ends of the blocks and project them beyond the face of the frame as it swings back substantially as and for the purpose described.

14. In a log-canter, the combination of a pivoted canter-frame; blocks pivoted to the frame-support; and means for elevating the forward ends of the blocks and projecting them beyond the face of the canter-frame to afford a bearing for the lower side of the log as the frame swings back.

15. In a log-canter, the combination of a pivoted canter-frame carrying a hook; blocks pivoted to the frame-support; and means carried by the frame for elevating the forward ends of the blocks and projecting them be-

yond the face of the frame to afford a bearing for the lower side of the log as the frame swings back.

16. In a log-canter, the combination of a pivoted canter-frame; blocks pivoted to the frame-support; and means controllable by the movement of the canter-frame for raising the forward ends of the blocks and projecting the same beyond the face of the frame as the frame begins to swing back and to lower the blocks into alinement with the face of the frame when the frame reaches that position where the log is to be discharged therefrom.

17. In a log-canter, the combination of a pivoted canter-frame provided with extended trunnions having arms or lugs O formed thereon; blocks P pivoted to the frame-support in rear of said trunnions and provided with cam-shaped recesses Q designed to fit over the lugs O, said lugs and cam-shaped recesses being so adapted and arranged as to elevate the forward ends of the blocks and to project the same beyond the face of the canter-frame during the first portion of its rearward movement; and means for raising and lowering the canter-frame.

18. In a log-canter, the combination of a pivoted canter-frame; forwardly-extending arms L pivoted to the rear of said frame; a curved hook N connecting the outer ends of the arms; and a cylinder intermediate of and connected to said arms for raising and lowering the same.

19. In a log-canter, the combination of a log-deck; a supporting-frame D secured below the same; a canter-frame pivoted within the support; log grasping and releasing mechanism carried by said canter-frame; a pivoted actuating-cylinder below the deck connected to the frame; and means for controlling the action of said cylinder and the log grasping and releasing mechanism.

20. In a log-canter, the combination of a canter-frame carrying a hook and a cylinder and piston for actuating the same; steam-inlets to said cylinder; a valve u for controlling the admission of steam to said cylinder; a valve-rod t; a pivoted arm s connected to said rod and provided with a slot in its end; and a handle or lever working in said slot for moving the arm.

21. In a log-canter, the combination of a pivoted canter-frame carrying a steam-actuated cylinder and hook; a working cylinder for moving the frame; a stand as q having pivoted thereto slotted arms p and s; a lever r mounted in said stand its lower end working in the slots; and connections between said arms and the hook-actuating cylinder, and the working cylinder.

22. In a log-canter, the combination of a pivoted canter-frame; a steam-cylinder for moving the same; a valve for controlling the admission of steam to said cylinder; a rocker-arm h connected to the valve-stem; a counter-weighted cross-shaft m; arm l and links i and j connecting said shaft and rocker-arm h; stand q; lever r; slotted arm p; and arm n and link o connecting said arm p and the shaft.

23. In a log-canter, the combination of a pivoted canter-frame; a power-cylinder carried thereby; and a hook connected to the frame and the cylinder and adapted to be operated by the latter, substantially as described.

24. In a log-canter, the combination of a canter-frame; a power-cylinder carried thereby and adapted to move back and forth approximately parallel to the face thereof; a hook connected to said cylinder and provided with a slotted rear end; and a pivot-pin extending from the frame through said slot.

25. In a log-canter, the combination of a pivoted canter-frame; a hook carried thereby; means for operating the hook also carried by the frame; means for swinging said frame back and forth; and means operating in conjunction with the hook and the frame, for supporting a log thereon, holding it as the frame begins its backward movement, and discharging the log as the frame nears its limit of backward movement.

26. In a log-canter, the combination of a canter-frame; a power-cylinder for moving the same; a check-cylinder also connected to the frame; valves for said cylinders; and means for causing said valves to work in unison, substantially as and for the purpose described.

In witness whereof I hereunto set my hand in the presence of two witnesses.

EDWARD EUGENE FITZGERALD.

Witnesses:

B. T. LEUZARDER,

GEO. H. BURNHAM.

No. 694,459. Patented Mar. 4, 1902.

J. R CARTER.

CONNECTING DEVICE.

(Application filed Aug. 7, 1901.)

(No Model.) 2 Sheets—Sheet I.

FIG. 1.

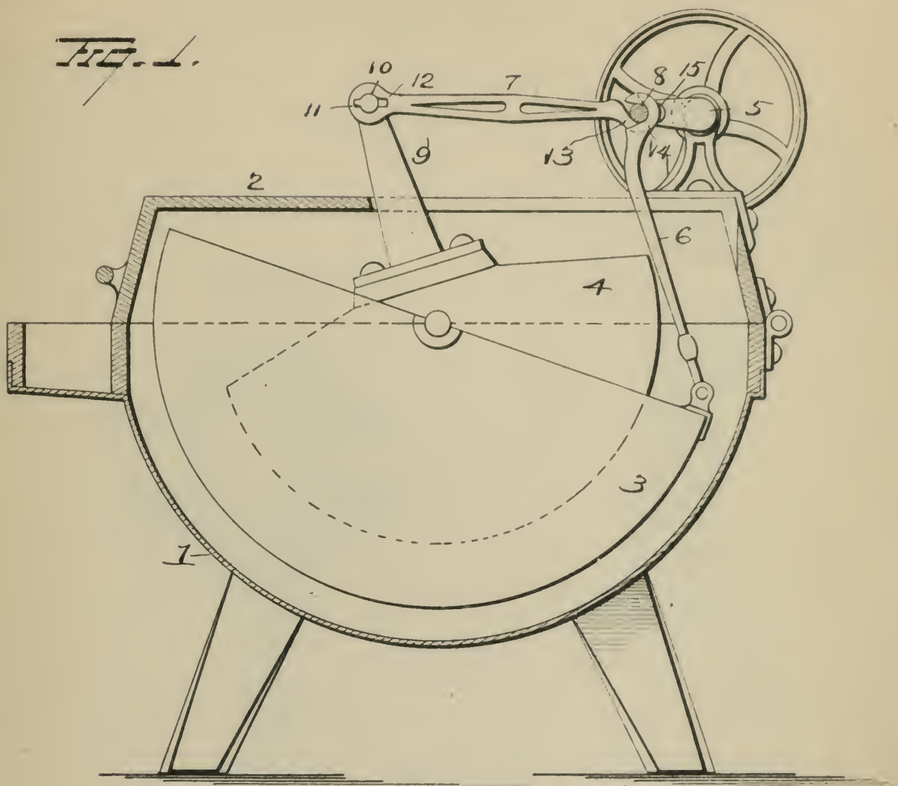
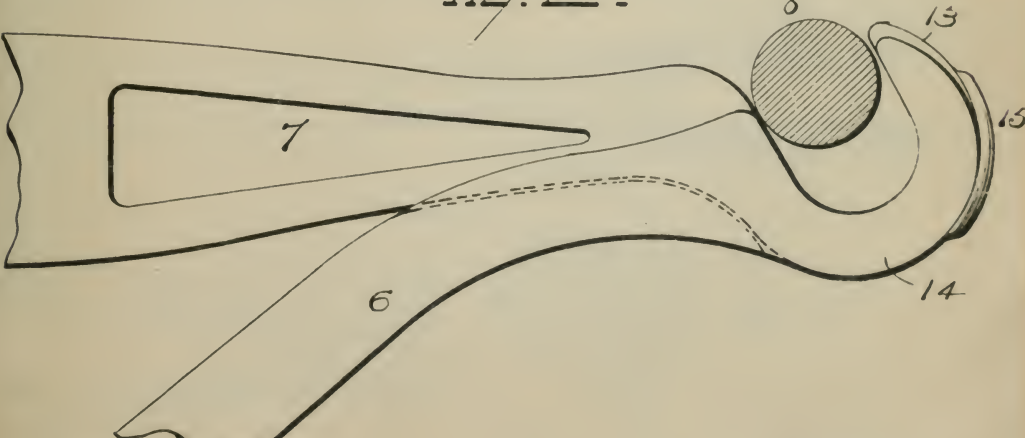


FIG. 2.



WITNESSES

E. J. Nottingham

S. J. Nottingham

INVENTOR

John R. Carter

By H. A. Seymour

Attorney

No. 694,459. Patented Mar. 4, 1902.

J. R. CARTER.

CONNECTING DEVICE.

(Application filed Aug. 7, 1901.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 3.

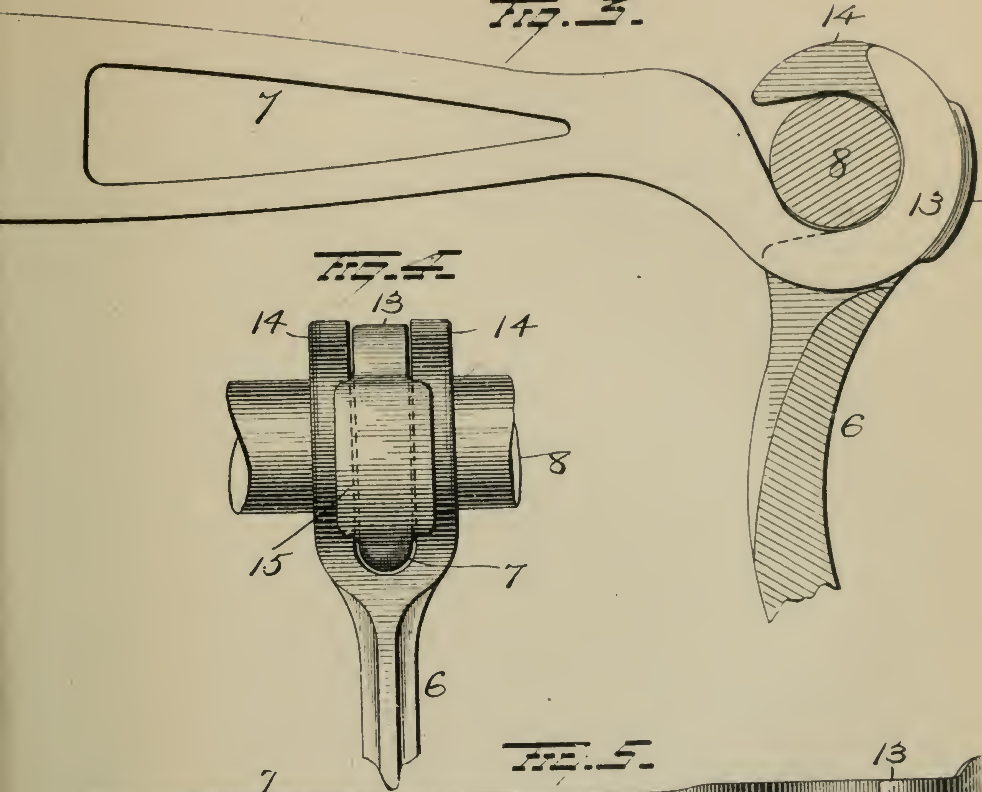
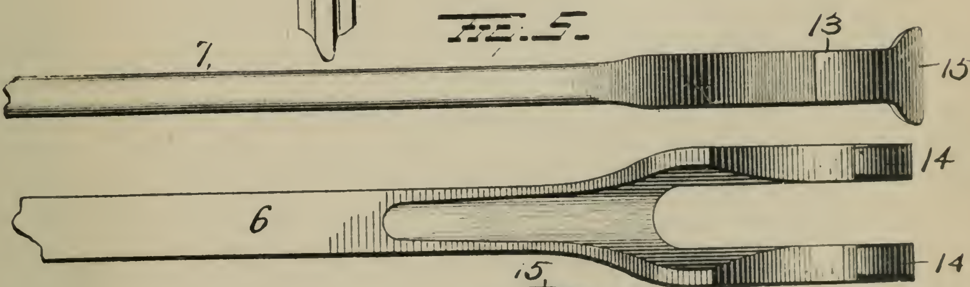


Fig. 4.

Fig. 5.



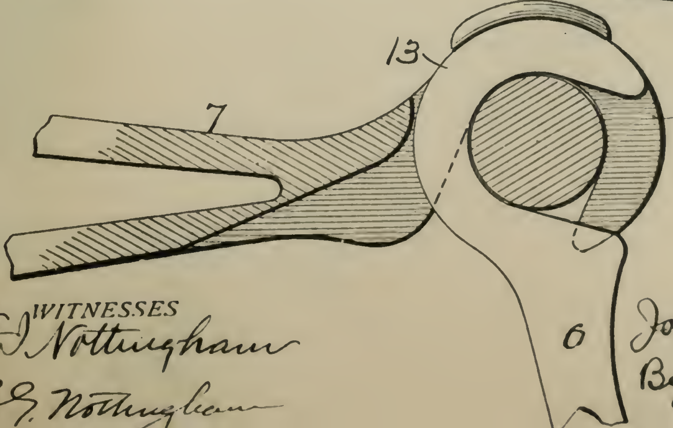


Fig. 6.

WITNESSES
E. J. Nottingham
S. G. Nottingham

INVENTOR
John R. Carter
By H. A. Seymour
Attorney

UNITED STATES PATENT OFFICE.

JOHN R. CARTER, OF AUGUSTA, KENTUCKY, ASSIGNOR TO ERNST H. HUENEFELD, OF CINCINNATI, OHIO.

CONNECTING DEVICE.

SPECIFICATION forming part of Letters Patent No. 694,459, dated March 4, 1902.

Application filed August 7, 1901. Serial No. 71,266. (No model.)

To all whom it may concern:

Be it known that I, JOHN R. CARTER, of Augusta, in the county of Bracken and State of Kentucky, have invented certain new and useful Improvements in Connecting Devices; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in connecting devices, and more particularly to means for connecting two pitmen with a single crank-shaft in such manner as to permit their easy removal but which will effectually hold them in position when in operation.

With this object in view the invention consists in certain novel features of construction and combinations and arrangements of parts, as will be more fully hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view illustrating my improvements on a washing-machine. Figs. 2, 3, and 4 are enlarged views illustrating the various positions of the connection. Fig. 5 is a plan view of the pitmen separated, and Fig. 6 is a view illustrating a modified form of my invention.

1 represents the body of the washing-machine, and 2 the cover therefor. A lower rubber 3 is mounted to reciprocate in the body 1 and coöperates with an upper rubber 4, also mounted to operate, but in a reverse direction, in said body. A crank-shaft 5 is mounted on the cover of the body 1, and its crank-arm 8 is connected by a pitman 6 with the lower rubber 3. Another pitman 7 is connected at one end with crank-arm 8 of said shaft 5 and at its other end with an upright or lever 9, projecting upward from the upper rubber and located in an elongated slot in the cover 2. It is to the connection between these pitmen and the crank-shaft that my present invention has particular reference.

The upright or lever 9 is provided on one side, at its upper end, with a stud or pintle 10 to receive one end of pitman 7, and said stud is provided at its outer end, on one side, with a lug or key 11 to aline with a keyway 12 in the pitman 7 when the latter is in a horizontal position and pointing away from the crank-shaft 5, and when the pitman is inserted on the stud it is thrown around to point toward the crank-shaft, and hence cannot become disconnected from the stud during the operation of the washer. The free end of this pitman 7 is provided with a hook 13, adapted to be placed on the crank-arm 8 of shaft 7, and the end of the other pitman 6 is made with double hooks 14, spaced apart sufficiently to receive the hook 13 between them, when all of said hooks will aline and can be inserted on the crank-arm 8. After said hooks are inserted on the crank-arm the pitman 6 is pivotally swung on the crank-arm to move the double hooks 14 out of alinement with the single hook 13 and is then attached to the lower rubber.

To prevent the outward movement of the double hooks from off the crank-arm, I provide the outer portion of the single hook 13 with an enlargement 15 to engage the outer portion of one or both of the double hooks, hence securely holding the same on the shaft. This enlargement 15 may be made in various ways—as, for instance, it might consist of an enlargement overlapping the outer edges of both double hooks, as shown, or it might consist of making the outer wall of the single hook 13 of greater width than its inner wall and beveling the inner faces of the double hook to receive the same. Hence I do not wish to be limited to the particular enlargement shown.

In assembling the parts the pitman 7 is first connected to the upright or lever 9, as above explained. The double hooks 14 on the end of pitman 6 are then inserted onto the single hook 13, so that they aline, and all the hooks are inserted on the lower half of the crank-arm, when the pitman 6 is turned on the crank-arm, its free end falling down through the slot in cover 2 and attached to the lower rubber 3, and when in this position the hooks will be out of alinement and their separation from the crank-arm prevented by the enlargement 15, as above explained.

By employing the double hooks 14 to receive between them the single hook 13 it is not necessary to employ shoulders on the crank-arm to hold them against lateral movement, as neither can move laterally without the

other, and hence a perfect joint is assured without the aid of other means.

If desired, the double hooks can be provided on pitman 7 and the single hook on pitman 6, and when so provided the hooks are assembled and first placed on the upper half of the crank-arm, as shown in Fig. 6.

Various slight changes might be resorted to in the general form and arrangement of the several parts described without departing from the spirit and scope of my invention, and hence I would have it understood that I do not wish to limit myself to the precise details set forth, but consider myself at liberty to make such slight changes and alterations as fairly fall within the spirit and scope of my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a double-pitman connection the combination of two pitmen, one having double hooks spaced apart and adapted to receive a shaft, the other pitman having a single hook to be disposed on the shaft between the double hooks and the outer portion of the single hook having an enlargement to engage the hook portion of the pitman having double hooks and lock both pitmen on the shaft when the hooks are moved out of alinement.

2. In a double-pitman connection, the combination of two pitmen and a shaft, one pitman having double hooks spaced apart and adapted to receive the shaft, the other pitman having a single hook to be disposed on the shaft between the double hooks and the outer portion of the single hook having lateral enlargements to overlap the outer edges of the double hooks when the hooks are moved out of alinement.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

JOHN R. CARTER.

Witnesses:
S. W. FOSTER,
G. F. DOWNING.

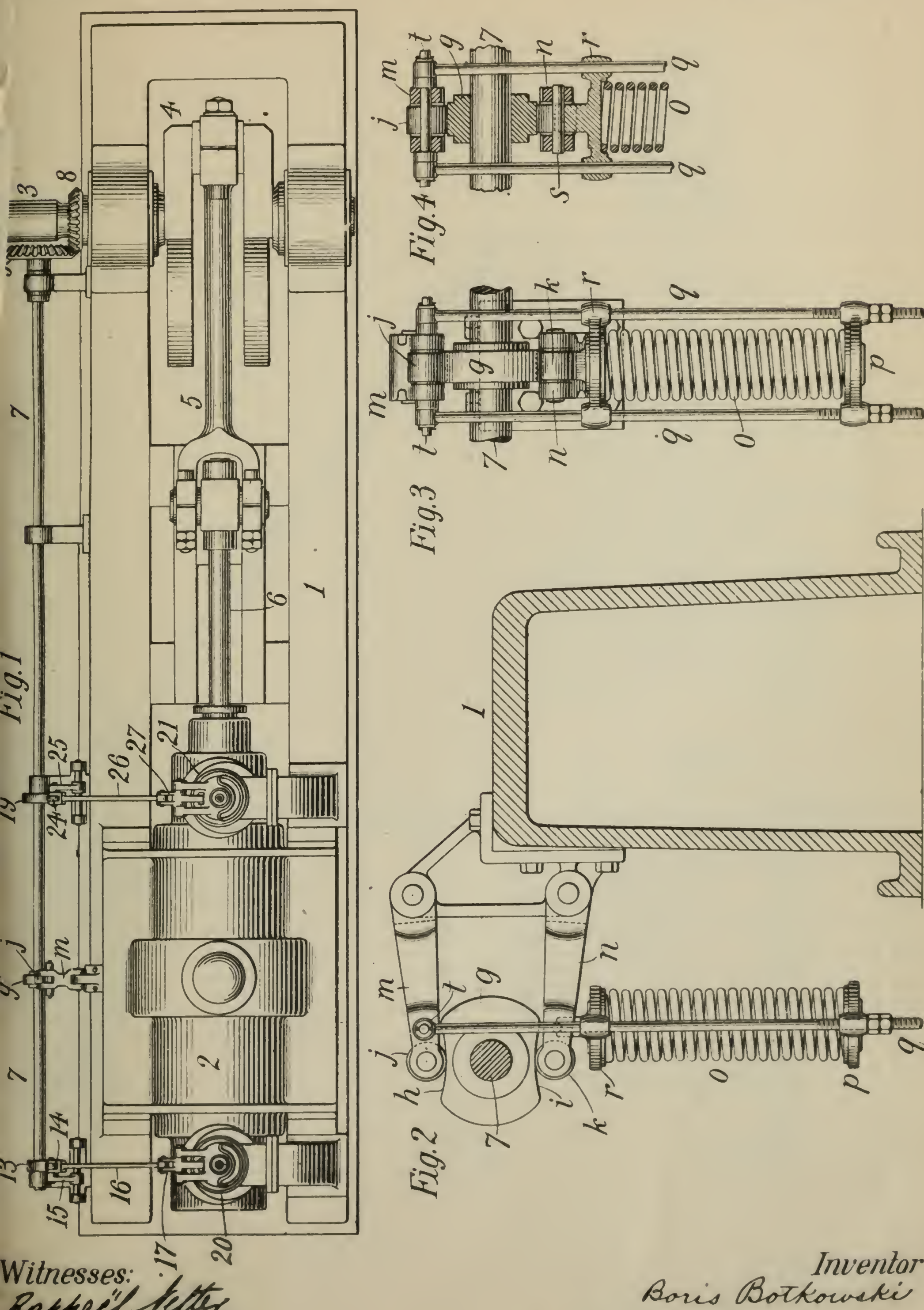
No. 759,857. PATENTED MAY 17, 1904.

B. BOTKOWSKI.

VALVE MECHANISM FOR ENGINES.

APPLICATION FILED FEB. 25, 1903. RENEWED OCT. 13, 1903.

NO MODEL. 2 SHEETS—SHEET 1.



Witnesses:
Raphaël Netter
Henry Barnes

Inventor
Boris Botkowski
by Henry D. Williams Att'y

No. 759,857. PATENTED MAY 17, 1904.

B. BOTKOWSKI.

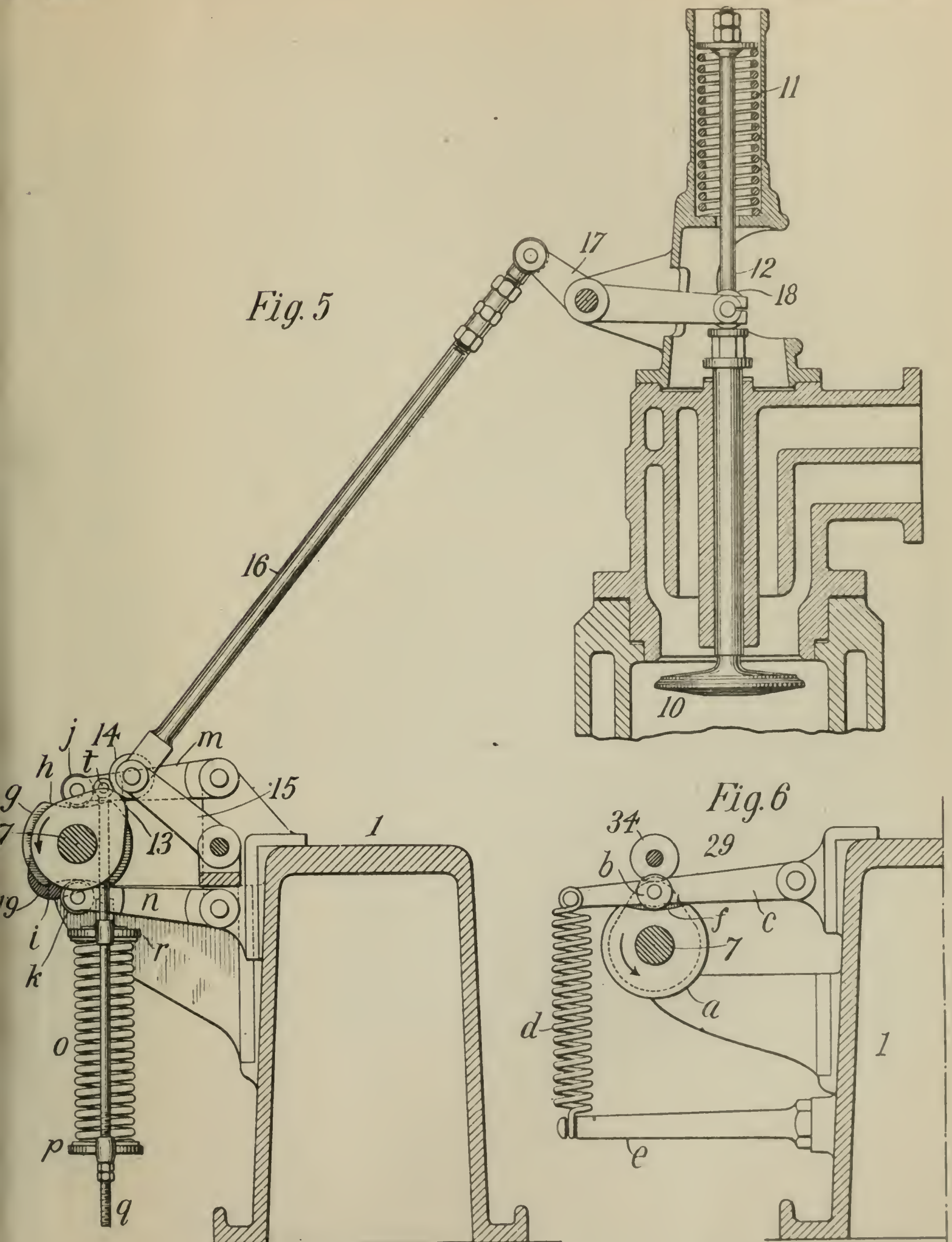
VALVE MECHANISM FOR ENGINES.

APPLICATION FILED FEB. 25, 1903. RENEWED OCT. 13, 1903.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 5

Fig. 6



Witnesses:
Raphaël Netter
Henry Barnes

Inventor
Boris Botkowski
by Henry D. Williams Att'y

No. 759,857. Patented May 17, 1904.

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UNITED STATES PATENT OFFICE.

BORIS BOTKOWSKI, OF NEW YORK N. Y., ASSIGNOR TO THE DE LA VERGNE REFRIGERATING MACHINE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

VALVE MECHANISM FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 759,857, dated May 17, 1904.

Application filed February 25, 1903. Renewed October 13, 1903. Serial No. 176,928. (No model.)

To all whom it may concern:

Be it known that I, Boris Botkowski, a subject of the Czar of Russia, residing in the borough of Manhattan, city of New York, county of New York, and State of New York, have invented certain new and useful Improvements in Valve Mechanisms for Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to valve mechanisms for engines, and has for its objects to counteract the variable thrusts upon a valve-shaft and to provide for a smooth and uniform rotative action of such shaft and to improve the construction and diminish the wear upon the working parts.

According to my invention I provide a resistance-controller for the valve mechanism, and my invention is particularly adapted for explosive or gas engines and includes certain combinations with the valve mechanism thereof.

I will now describe the construction of gas-engine and resistance-controller combined therewith which is shown in the accompanying drawings and will thereafter point out my invention in claims.

Figure 1 is a general plan view of a gas-engine having a valve mechanism embodying my invention. Fig. 2 is a detail end elevation of the resistance-controller. Fig. 3 is a side elevation of the same. Fig. 4 is a part section of the same. Fig. 5 is a sectional elevation of one of the valves and of the valve-shaft with the several cams thereon. Fig. 6 is an end elevation of a modified construction of resistance-controller and the single valve-cam for which it is adapted.

The gas-engine partly shown in the drawings is of the well-known Koerting double-acting two-cycle type and comprises a bed-frame 1, carrying a cylinder 2 and crank-shaft 3. The crank 4 is joined by a connecting-rod 5 to the piston-rod 6. The valve-shaft 7 receives motion from the crank-shaft 3 by means of meshing bevel-gears 8 and 9, respectively, secured to these shafts. Two puppet inlet-valves are provided, one for each end of the cylinder, these valves being located in casings 20 and 21, respectively. These valves are of identical construction, and I have therefore shown in detail, Fig. 5, only the valve 10 for the head end of the cylinder. This valve 10 is held closed by a compressible spring 11, engaging with the valve-stem 12, and is actuated from the cam 13 on the valve-shaft 7, a cam-roller 14 engaging such cam and being carried by a pivoted arm 15 and a link 16 and the link 16 being pivotally connected to the valve-lever 17. The valve-lever 17 carries a roller or rollers 18, engaging the valve-stem 12. The cam 19 of the other inlet-valve is secured upon the valve-shaft in a position diametrically opposite to that of the cam 13 of the valve 10. The connecting parts of this valve are exactly the same as of the valve 10, comprising a cam-roller 24, pivoted arm 25, link 26, and valve-lever 27.

The parts above described are of ordinary construction in the type of gas-engines shown. It is evident that during the movement of each valve-cam which effects the opening of the corresponding inlet-valve against the resistance of the valve-spring the valve-spring exerts a backward thrust upon the valve-shaft. This movement has just been completed for the valve 10 in the position of parts shown in Fig. 5. It is also evident that during the movement of each cam which permits the closing of the corresponding inlet-valve under the resilient action of the valve-spring the valve-spring exerts a forward thrust upon the valve-shaft. Therefore as each cam opens and closes the corresponding inlet-valve and compresses and permits the extension of the corresponding valve-spring the valve-shaft receives a backward and then a forward thrust. As these engines are operated at high speed, these thrusts are, in fact, impulses or blows and cause excessive wear upon the transmission-gears and other parts and, in fact, with the slightest backlash in the bevel-gears 8 and 9 cause a constant rattling of these gears. According to my invention I provide a resistance-controller coacting with the valve-shaft, so as to

oppose resistances to the thrusts of the valve-springs, which shall be approximately or exactly equal to such thrusts, thereby counterbalancing the thrusts of the valve-springs, so that the resistance of the valve-shaft at the transmission-gearing is always a positive quantity and approximately a constant quantity and is approximately only the friction of the several bearings. Thus the transmission-gearing has only to overcome an approximately constant and slight resistance and the rotative movement of the valve-shaft will be smooth and continuous, no amount of back-lash in the gearing can cause rattling of the gears, and the wear of parts will be reduced to a minimum.

The resistance-controller in simple form is illustrated in Fig. 6, wherein it is constructed to oppose the thrusts of a single valve-cam 29 on the valve-shaft 7. The cam-roller 34 of this valve-cam is shown, but other connecting parts omitted. A resistance-cam *a* is provided on the same valve-shaft 7 which coacts with a cam-roller *b*, the cam-roller being carried by a pivoted arm *c*, which is connected at its outer end to the extension-spring *d*, held at its lower end by the fixed stud *o*. The resistance-cam *a* is so shaped relatively to the valve-cam 29 that the resistance-cam roller *b* opposes an equal forward thrust to the backward thrust of the valve-cam roller 34 and an equal backward thrust to the forward thrust of the valve-cam roller 34. For example, in the position of parts shown in Fig. 6, wherein the two cam-rollers are shown in radial alinement for clearer illustration, the valve-cam roller 34 has just completed its movement away from the axis of the valve-shaft and the resistance-cam roller *b* has just completed its movement toward the axis of the valve-shaft, the valve-cam roller being at the highest point of its cam 29 and the resistance-cam roller at the lowest point of the depression *f* of its cam *a*. During this movement the two cam-rollers have applied equal and opposite thrusts to the valve-shaft, the resultant of which was zero. The next movement of these parts will be that of the valve-cam roller 34 toward the axis of the cam-shaft and of the resistance-cam roller *b* away from such axis, and these opposite movements will apply equal and opposite thrusts to the valve-shaft, so that the resultant of the thrusts from the valve-spring and the resistance-spring will be zero. Upon the completion of the strokes of the two cam-rollers both will rest upon circular portions of their cams and will rotate thereon without imparting other resistance to the rotation of the cam-shaft than the friction of the bearings, and this friction of the bearings will be the approximately constant and slight resistance will be offered to the rotation of the cam-shaft during all parts of its movement.

In the double-acting engine shown two oppositely-arranged valve-cams 13 and 19 are provided, as above described, and by reason of the diametrically opposite arrangement of these cams I provide a resistance-cam *g* with diametrically opposite depressions *h* and *i*. The cam-rollers *j* and *k*, respectively, are carried by pivoted arms *m* and *n*, respectively, and the resistance-spring *o* presses at its lower end against the cross-head *p*, this cross-head being connected by rods *q q* to the upper cam-roller arm *n*, and presses at its upper end against a cross-head *r*, sliding on said rods *q q*. The rods *q q* are pivotally connected to the upper cam-roller arm *m* by a pin *t*, and the upper cross-head *r* thrusts against a pin *s* of the lower cam-roller arm *n*, and the angular arrangement is such that these pins are always in alinement with the rods *q q*. By this double cam the resistance of the spring *o* is applied at both cam-rollers in the direction toward the axis of the valve-shaft and is thus doubled in its resistance to the forward and backward thrusts upon the valve-shaft, and the resistance-controller as a whole is operated first to oppose the thrusts of the movement of one valve and then in diametrically opposite position to oppose the thrusts of the movement of the other valve, and thus the same parts with the valve-shaft in diametrically opposite positions oppose the thrusts resulting from the movements of both inlet-valves.

It is evident that various modifications may be made in the constructions shown and above particularly described within the spirit and scope of my invention.

What I claim, and desire to secure by Letters Patent, is—

1. The combination with a valve-shaft and means for actuating a valve therefrom adapted to impart variable thrusts thereto, of a resistance-controller comprising a cam and a resisting device coacting therewith to apply to the valve-shaft opposed resistances to the thrusts of the valve mechanism.

2. The combination with a valve-shaft, a cam thereon, a valve actuated by such cam and a spring opposing the movement of the valve in one direction and compelling the movement of the valve in the other direction, of a resistance-controller comprising another cam on the valve-shaft and a resisting device coacting therewith to apply to the valve-shaft opposed resistances to the thrust of the valve-spring.

3. The combination with a valve-shaft, a cam thereon and valve actuated by such cam and a spring opposing the movement of the valve in one direction and compelling the movement of the valve in the other direction, of a resistance-controller comprising another cam on the valve-shaft and a spring coacting therewith to oppose the thrusts of the valve-spring.

4. The combination with a valve-shaft, two valves and valve-springs, diametrically oppo-

site cams on the valve-shaft, one cam for each valve, each cam being arranged to cause the movement of its valve in one direction against the resistance of the valve-spring and to permit the movement of the valve in the other direction under the resilient action of the valve-spring, of a resistance-controller comprising another cam on the valve-shaft with diametrically opposite depressions and rises and a spring coacting therewith and arranged to apply its resistance at diametrically opposite parts of the valve-shaft to oppose the thrusts of the valve-springs.

5. In a gas-engine, in combination, a valve-shaft geared to the crank-shaft, two inlet-valves and valve-springs, the valve-cam 13 on the valve-shaft and the cam-roller 14 coacting therewith and connected to one inlet-valve, another valve-cam 19 on the valve-shaft and the cam-roller 24 coacting therewith and connected to the other inlet-valve, the resistance-cam *g* also on the valve-shaft, the cam-rollers *j* and *k* coacting therewith, the pivoted arms *m* and *n*, each carrying one of such rollers, the cross-heads *p* and *r* each connected with one of such pivoted arms, and the resistance-spring *o* working between such cross-heads, substantially as set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

BORIS BOTKOWSKI.

Witnesses:

HENRY D. WILLIAMS,

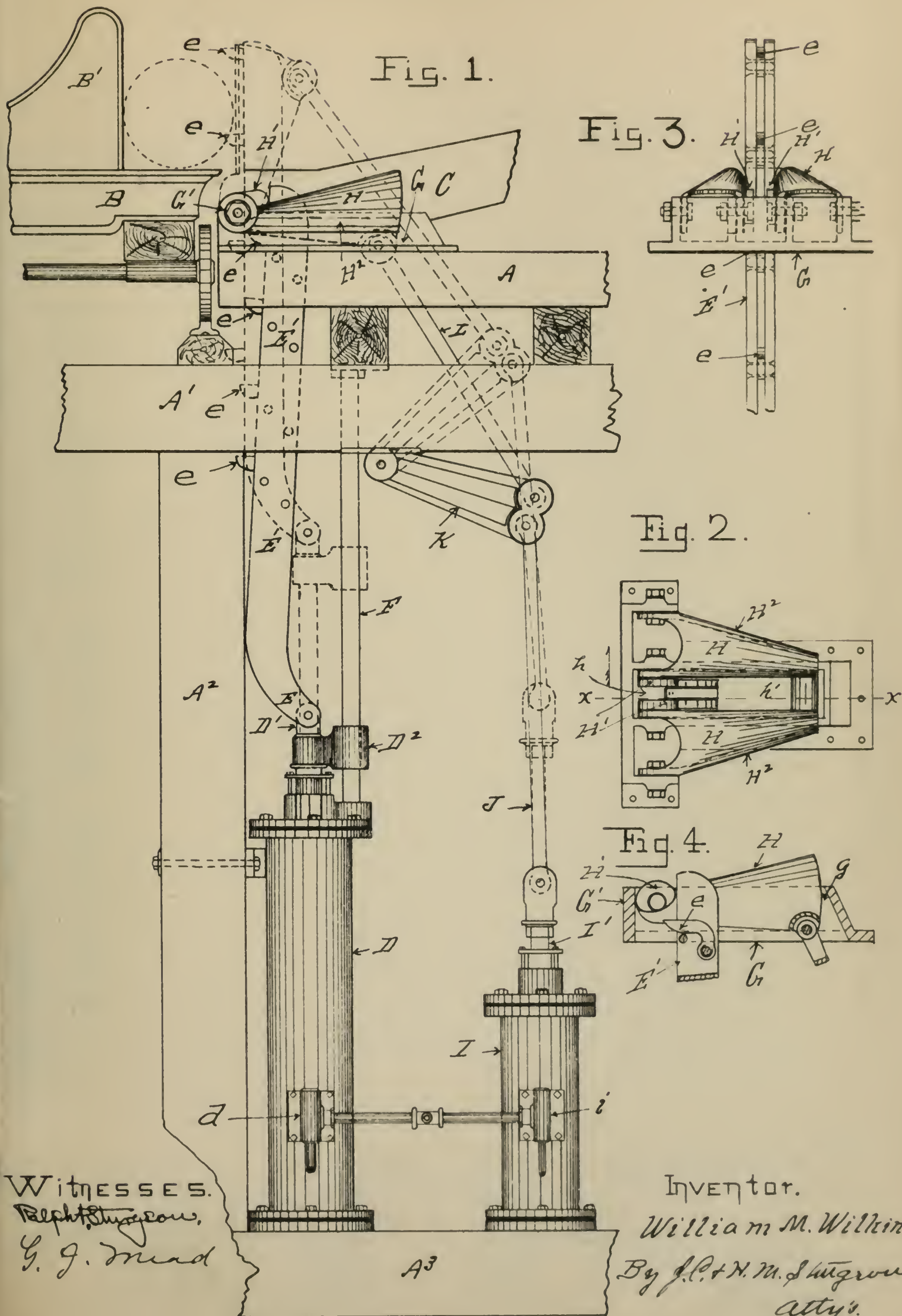
LIVINGSTON EMERY.

No. 778,522. PATENTED DEC. 27, 1904.

W. M. WILKIN.

LOG TURNING MECHANISM.

APPLICATION FILED APR. 27, 1904.



Witnesses.
Ralph ? Sturgeon,
G. J. Mead

Inventor.
William M. Wilkin
By J. C. & H. M. Sturgeon
Atty's.

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UNITED STATES PATENT OFFICE.

WILLIAM M. WILKIN, OF MOBILE, ALABAMA.

LOG-TURNING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 778,522, dated December 27, 1904.

Application filed April 27, 1904. Serial No. 205,159.

To all whom it may concern:

Be it known that I, WILLIAM M. WILKIN, a citizen of the United States, residing at Mobile, in the county of Mobile and State of Alabama, have invented certain new and useful Improvements in Log-Turning Mechanism; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, forming part of this specification.

This invention relates to log-turning mechanism for sawmills, and has for its object the construction of a log-turner with an auxiliary mechanism for rolling a log from a logway to and upon a saw-carriage, which mechanism also operates not only to force the toothed turning-bar against the log during its upward traverse, but to move the tooth-bar back from the log when it is desired to move the tooth-bar downward, whereby the teeth of the tooth-bar can be withdrawn from the log in a direct line, and thereby prevented from unnecessarily mutilating it.

The features of my invention are hereinafter fully set forth and described, and illustrated in the accompanying drawings, in which—

Figure 1 is a side view in elevation of a log-turning mechanism embodying my invention with sections of a logway and saw-carriage. Fig. 2 is a top or plan view of a portion of the log-turning mechanism. Fig. 3 is a front view in elevation of the same looking toward the logway. Fig. 4 is a vertical section of the part shown in Fig. 2 on the line *x x*.

In the accompanying drawings, illustrating this invention, A A′ A^2 A^3 represent a portion of the mill-frame, B a saw-carriage, B′ the carriage-knees, and C a logway, all of the ordinary construction. The turning-bar cylinder D is mounted on the base A^3 of the mill-frame and is provided with a valve mechanism *d* of the usual construction, and from the piston (not shown) in the cylinder D a piston-rod D′ extends upward to and is pivoted to the offset lower end E of the toothed turning-bar E′. On the upper end of the piston-rod D′ there is a guide D^2, operating on a vertical slide F, secured to the head of the cylinder D and to the mill-frame, so as to resist the side thrust of the bar E′ caused by the offset E therein.

On the part A of the mill-frame I secure a slotted plate or frame G, with its front end G′ toward the saw-carriage B. This front end G′ of the frame G is made of considerable width, so as to provide an adequate base therefor, and in this front end G′, I pivot a bifurcated lever or crowding-bar H. This crowding-bar is provided on its pivoted end with cam-surfaces H′ H′, with a vertical opening *h* between them, and in the rear thereof the opening *h*′ is the thickness of the cam-surfaces H′ H′ wider, so that the tooth-bar E will operate up and down therein with the front edges thereof in contact with the cam-surfaces H′ H′ and with the teeth *e* thereon passing up through the opening *h* between the cam-surfaces H′ H′. The upper surfaces of the arms of the lever or crowding-bar H are preferably made with curved wings H^2 thereon, which curve downward over the upwardly-extending sides *g* of the frame G. The upper surfaces of the sides of the crowding-bar H are rounded from the inside faces of the opening *h*′ therein to the lower edges of the wings h^2 thereon, as illustrated in Figs. 1, 2, and 3, so that when the crowding-bar H is forced against a log moving longitudinally on the saw-carriage B there is no surface on the crowding-bar to catch on a knot or other obstruction on the log, and thereby be forced sidewise and broken.

For operating the lever or crowding-bar H, I secure a cylinder I upon the base A^3 of the mill-frame, provided with suitable valve mechanism *i* of the usual construction, and from a piston (not shown) in the cylinder I a piston-rod I′ extends upward to and is pivoted to the lower end of a lever K, the opposite end of which is pivoted to the mill-frame. To the free end of the lever K, I pivot another link L, which extends to and is pivoted to the free end of the lever H, as illustrated in Figs. 1 and 4. This mechanism operates to raise and lower the free end of the lever or crowding-bar H, as desired. In operation the operator can operate the crowding-bar mechanism in-

dependently of the tooth-bar mechanism to roll a log from the logway C upon the carriage B and against the carriage-knees B′ and hold it there, if desired, while the tooth-bar E is run upward to roll the log over, as desired, the cross-bar at the rear of the lever or crowding-bar H also operating when the tooth-bar is raised to press against the rear edge of the tooth-bar and retain the teeth thereof in contact with the log and prevent their tearing out therefrom, and when the crowding-bar H is moved back to its normal position the cam-surfaces H′ thereon operate to move the tooth-bar back from the log in a direct line, so as to remove the teeth e therefrom without unduly mutilating the log.

Having thus fully described my invention, so as to enable others to construct and operate the same, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a log-turning mechanism, the combination of a slotted plate or frame adapted to be secured to the mill-frame with its front end toward the front of a saw-carriage, a bifurcated crowding-bar pivoted in the end of said frame toward the saw-carriage, a tooth-bar movable up and down through the opening of said bifurcated lever, cam-shaped shoulders on the pivotal end of said bifurcated crowding-bar, adapted to engage the front edge of the tooth-bar at each side of the teeth thereon, means for moving the tooth-bar up and down, and means for raising and lowering the free end of said bifurcated lever, substantially as set forth.

2. In a log-turning mechanism, the combination of a slotted frame adapted to be secured to the mill-frame with its front end toward and in front of the saw-carriage, a bifurcated crowding-bar having its open end pivoted in the front end of said frame, a tooth-bar movable up and down through the opening in said bifurcated crowding-bar, cam-shaped shoulders on the pivotal end of said bifurcated crowding-bar adapted to engage the front edge of the tooth-bar at each side of the teeth therein when the free end of the crowding-bar is being lowered to its normal position, a surface on the rear or free end of said crowding-bar adapted to engage the rear edge of the tooth-bar when the crowding-bar is raised, cylinder, piston, and guide mechanism connected with and moving the tooth-bar up and down, and cylinder, link and lever mechanism connected with and operating the bifurcated crowding-bar mechanism, substantially as set forth.

3. In a log-turning mechanism, the combination of a slotted frame, adapted to be secured to a mill-frame floor in front of a saw-carriage, a bifurcated crowding-bar pivoted in the front end of said frame, curved and rounded upper edges on said crowding-bar, cam-surfaces on the inner faces of the pivoted end of said crowding-bar, and mechanism for operating said crowding-bar, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM M. WILKIN.

Witnesses:
Richard W. Stoutz,
Irving Vautrott.

No. 852,231. PATENTED APR. 30, 1907.

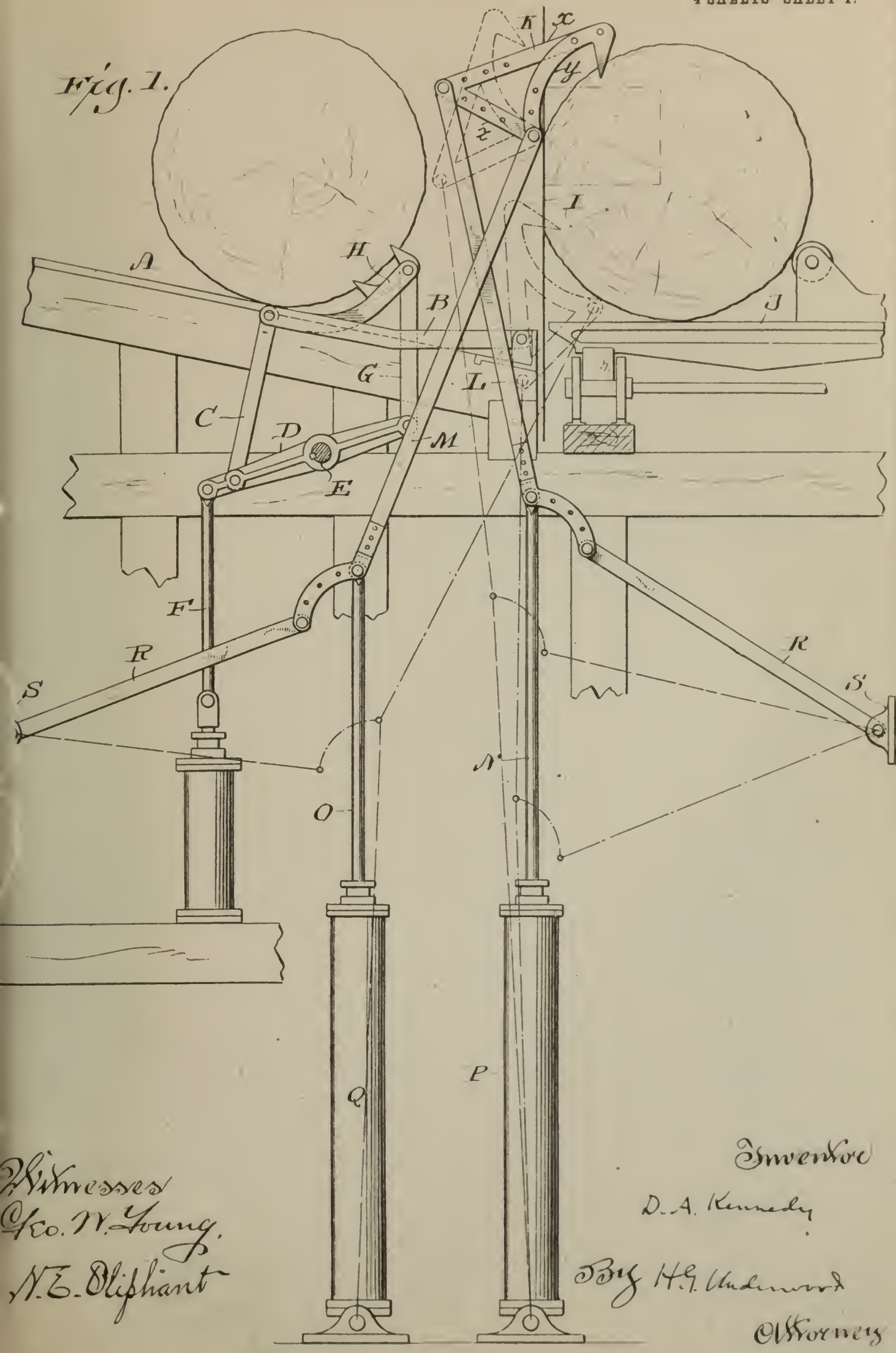
D. A. KENNEDY.

LOG TURNER.

APPLICATION FILED APR. 26, 1905.

4 SHEETS—SHEET 1.

Fig. 1.



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No. 852,231. PATENTED APR. 30, 1907.

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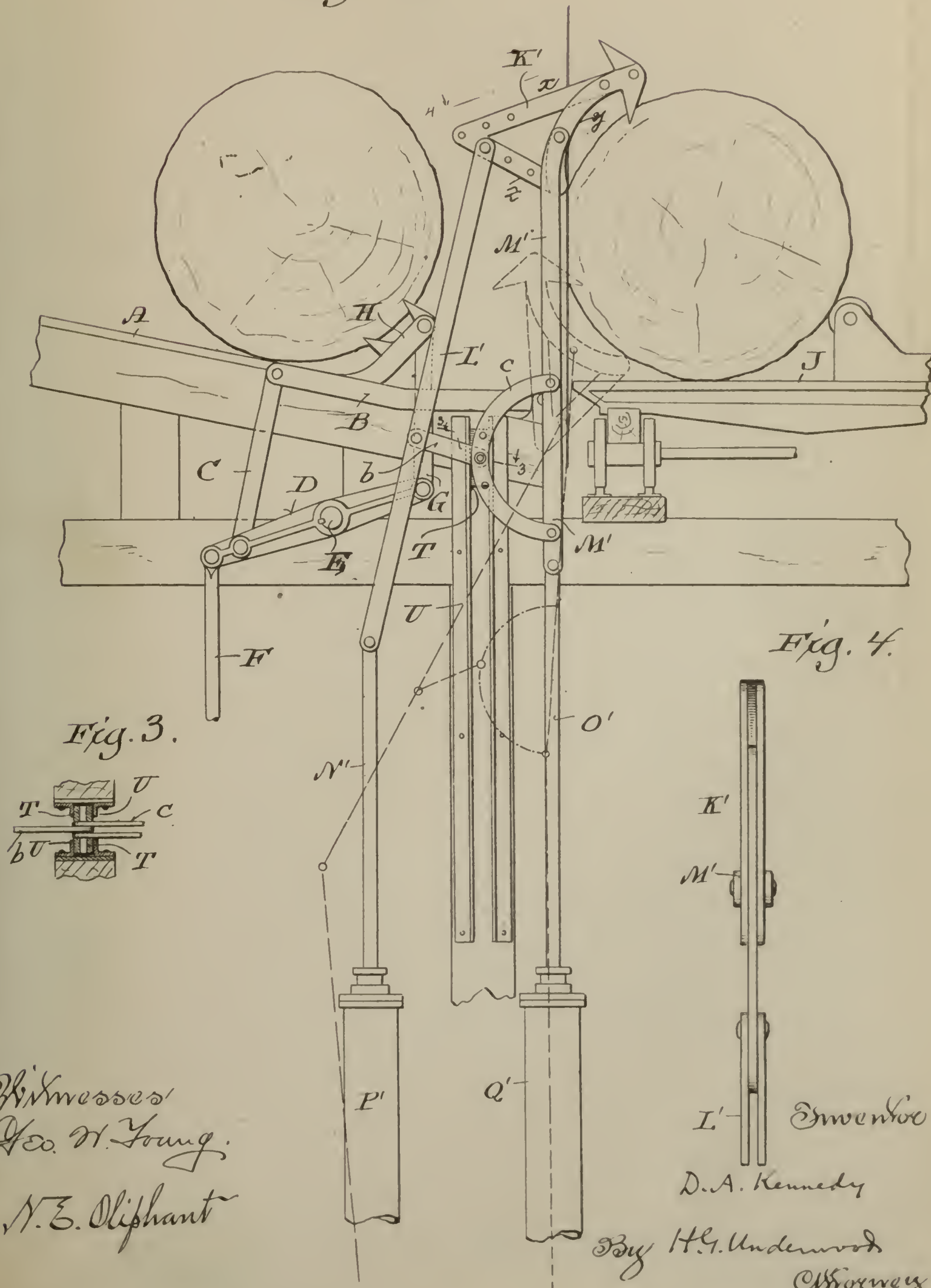
APPLICATION FILED APR. 26, 1905.

4 SHEETS—SHEET 2.

Fig. 2.



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No. 852,231. PATENTED APR. 30, 1907.

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APPLICATION FILED APR. 26, 1905.

4 SHEETS—SHEET 3.

Fig. 6.

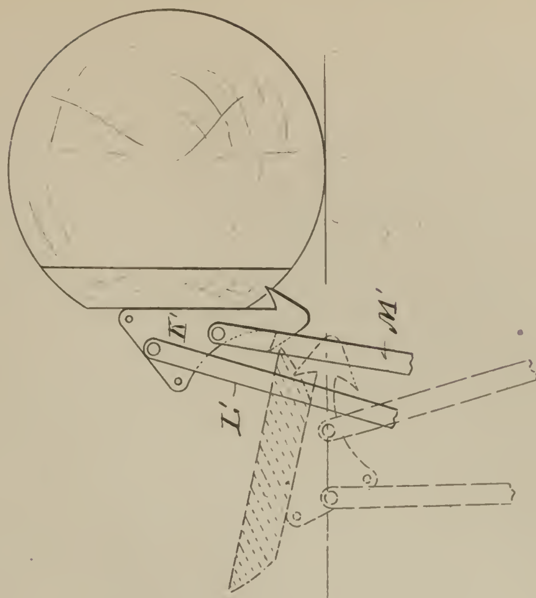
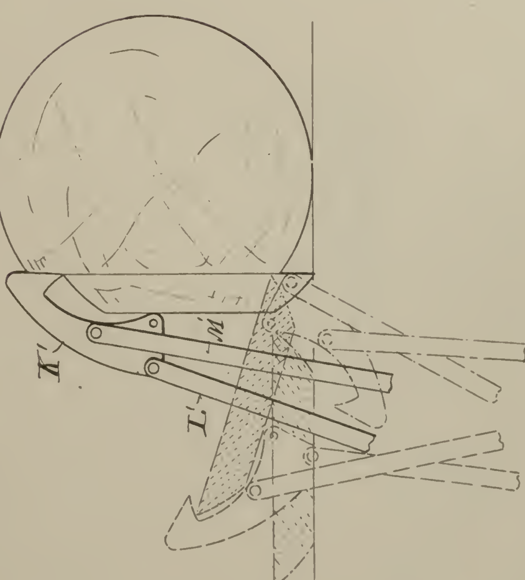


Fig. 5.



Witnesses

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No. 852,231. PATENTED APR. 30, 1907.

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LOG TURNER.

APPLICATION FILED APR. 26, 1905.

4 SHEETS—SHEET 4.

Fig. 9.

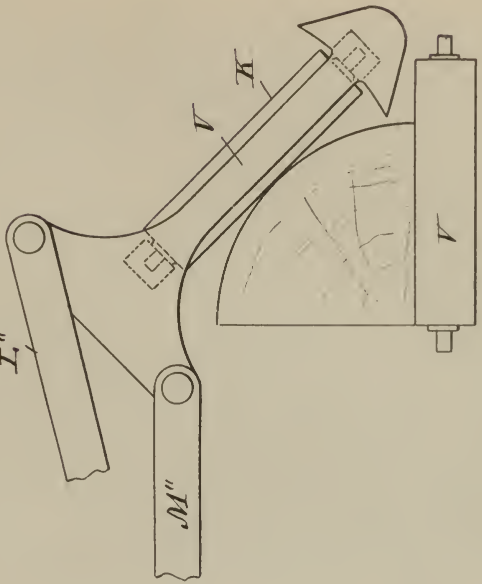

Fig. 8.

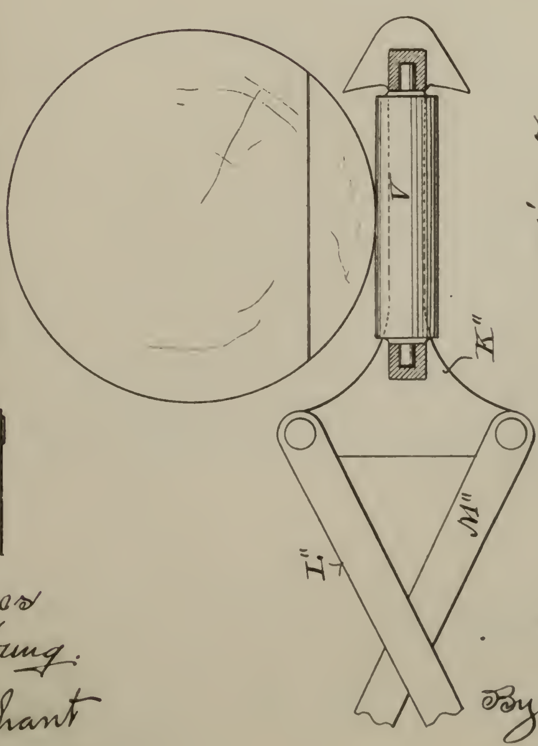

Fig. 7.

Witnesses
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Inventor
D. A. Kennedy
By H. G. Underwood
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UNITED STATES PATENT OFFICE.

DONALD A. KENNEDY, OF ASHLAND, WISCONSIN.

LOG-TURNER.

No. 852,231. Specification of Letters Patent. Patented April 30, 1907.

Application filed April 26, 1905. Serial No. 257,404.

To all whom it may concern:

Be it known that I, DONALD A. KENNEDY, a citizen of the United States, and a resident of Ashland, in the county of Ashland and State of Wisconsin, have invented certain new and useful Improvements in Log-Turners; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention consists in certain peculiarities of construction and combination of parts herein specified with reference to the accompanying drawings and subsequently claimed, its object being to provide simple, economical and efficient log-turners having the various uses and advantages hereinafter set forth.

Figures 1 and 2 of the drawings represent elevations of as many different forms of my improved log-turner, and also illustrate a log-deck and log-carriage: a slide and guide shown in Fig. 3, being omitted in Fig. 2; Fig. 3, a sectional view of a fragment of one form of the log-turner, the same being indicated by lines 3—3 in Fig. 2; Fig. 4, a plan view of another fragment of said log-turner indicated by line 4—4 in said Fig. 2; Figs. 5 and 6, diagrams illustrating operations of the log-turner; Fig. 7, a side elevation, partly in section, of a fragment of another form of the log-turner employed as a support for a moving plank and log; Fig. 8, a back view of said fragment of the latter form of the invention, and Fig. 9, a side elevation of the same opposing a log-quadrant supported on a re-saw roller.

Referring by letter to the drawings, A indicates a log-deck, B one of a plurality of parallel skids in pivotally adjustable connection with the incline of said deck, the upper end of the skid being in pivotal connection with a vertically disposed pitman C likewise connected to an arm of a lever D fast on a rock-shaft E and connected to a pitman F that is coupled to a suitable actuating device. Said pitman is shown coupled to the rod of a piston (not shown) that is reciprocated by steam or other fluid-under-pressure, in a suitably arranged cylinder. Another arm of the lever is connected, by a link G, with a stop-bar H loose at one end on the pivot of said skid, the construction and arrangement of parts thus far described being analogous to what has been previously set forth in my Patent 778366, of December 27, 1904. A saw I is shown between the log-deck and the line of travel of a log-carriage J, this carriage being of ordinary construction. The log-turner herein particularly set forth is positioned in practice similar to those ordinarily employed, and in any of its several forms, it comprises an approximately triangular canter-head having one or two hook-points at the apex thereof and a pair of pitmen (crossed or otherwise) in connection with said head, these pitmen being also coupled to the rods of pistons reciprocated, by steam or other suitable fluid-under-pressure, in preferably oscillative cylinders. The connection of each pitman with the canter-head is adjustable or otherwise, as preferred for various operations, and each connection constitutes an axis for said head.

In Figs. 1 and 2, the canter-head K of the log-turner has a straight side x and a curvilinear side y. Adjacent to its sides and base z in Fig. 1, the canter-head is provided with a series of apertures, and crossed pitmen L, M, are held in adjustable connection with said head, by pivot-bolts engaging selected apertures in the series. By having the pitmen in adjustable connection with the canter-head, the leverage on same may be varied. The pitmen are respectively coupled to the rods N, O, of pistons that have their reciprocation in cylinders P, Q, these cylinders being preferably pivoted so as to be oscillative. In preferably adjustable connection with the lower offset segment end of each pitman is a link R that is also in connection with a bracket S stationary on a suitable support. Links of different length may be employed to connect the pitmen and brackets aforesaid, the function of the links being to guide the piston-rods N, O, in substantially rectilinear lines, the cylinders P, Q, being oscillative to compensate for slight departure of said rods from rectilinear lines due to the arc of movement of the outer ends of said links.

In Fig. 2, the pitmen L′, M′, are not crossed, but the pitman L′ is connected by a link b with a segmental projection c of the pitman M′, and this pitman and the link are in connection with a slide T for which a vertical guide U is provided. The pitman-projection c is provided with a plurality of pivot-pin apertures to provide for adjustable connection therewith of the link b, and the function of said link and guided pitman-projection is the same as the links R in connection with the crossed pitmen L, M, in Fig. 1. It being understood that the pivot-pin connecting the link b and pitmen-projection c also

engages the adjacent slide T. The canter-head K′ of the log-turner shown in Fig. 2, has two hook-point projections at its apex in opposite directions, while in Fig. 1, said head has a single hook-point on its curvilinear side. The canter-head shown in Figs. 1, 2 and 4, comprises a plurality of plates bolted together, and each pitman is shown as comprising a pair of parallel plates straddling said head, as is clearly shown in Fig. 4. In Fig. 3, it is shown that the segmental projections *c* of the plates pertaining to the pitman M′ straddle the link *b* to which they are connected, and the slide in connection with said projections and link comprises two blocks each having its own guide.

In Figs. 7, 8 and 9, the canter-head K″ of the log-turner is a two hook-point device comprising a pair of plates spaced apart, the whole being a single casting or otherwise, and a roller V is journaled in the spacers to project in opposite directions from said head longitudinally of the same. In Figs. 1 and 2 the canter-head is shown by full lines, in position prior to commencing to turn a log on the carriage, and fluid-under-pressure being properly applied in the cylinders P, Q, or P′, Q′, a straight downward motion is had by said head. By increasing the pull of the piston rod N or N′, the log will be turned in the direction of its circumference, the canter-head keeping the same relative position as when the operation begun. Now by pushing the pitman M or M′ upward and pulling the pitman L or L′ downward, the canter-head is swung approximately one quarter of a turn on one of its pivots to the position shown by dotted lines, after which a slight upward movement of said pitman L or L′ and downward movement of said pitmen M or M′ will result in the point of said head being released from the log and dropped below the deck-line. At the proper time, the canter-head is again brought into engagement with the log, by proper manipulation of the pitmen connecting it with the piston-rods, the approach of said head to attach said log being shown by dotted lines in Fig. 1. When the log is squared, the canter-head is manipulated by the piston-rods and pitmen to hook over the upper outer edge of the timber prior to a turning operation, said timber being indicated by dotted lines in Fig. 1. The turning operation for the timber is the same as for a log.

In Fig. 5, it is shown that the canter-head may be manipulated to lower a plank cut from a log, the various positions of said head being shown by full and dotted lines. The canter-head in said Fig. 6 is of the same form as the one shown in Fig. 2, and is shown adjusted to have the back point or hook thereof engage a plank to support the same when separated from the log. It is also shown, by dotted lines, in Fig. 6, that the canter-head may be manipulated to lower and push said plank away from a vertically cutting saw.

In Fig. 7, the canter-head having a roller therewith is shown employed to support a plank and log while in motion in a direction opposite to the lower straight portion of a horizontal band-saw, and in Fig. 9, the same form of head is shown, as a means for holding a log-quadrant on a re-saw roller while in motion, the roller V with said head being in contact with said log-quadrant.

Having thus described my invention, what I claim as new, and desire to secure by Letters-Patent, is:—

1. A log-turner comprising a canter-head of approximately triangular form hook-pointed at the apex as well as provided with a series of apertures adjacent to its sides and base, and pitmen in pivot-bolt connection with selected apertures in the series.

2. A log-turner comprising a canter-head of approximately triangular form hook-pointed at the apex, a roller journaled in connection with said head longitudinally of the same to project therefrom in opposite directions, and pitmen in connection with the aforesaid head for which each connection constitutes an axis.

3. A log-turner comprising a canter-head of approximately triangular form hook-pointed at the apex, pitmen having ends thereof in pivotal connection with said head, piston-rods with which the other ends of the pitmen are in pivotal connection, oscillative cylinders in which the rods aforesaid are reciprocative, and means in connection with said pitmen for guiding the piston rods in substantially rectilinear lines, oscillation of the cylinders serving to compensate for slight departure of said rods from said lines incidental to the movements of said pitmen and their connections.

4. A log-turner comprising a canter-head of approximately triangular form hook-pointed at the apex, pitmen having ends thereof in pivotal connection with said head, piston-rods with which the other ends of the pitmen are in pivotal connection, oscillative cylinders in which the rods aforesaid are reciprocative, a slide and vertical guide for same, and a link connecting one of the pitmen with a projection of the other, a pivot-pin joining the link and pitman projection being in connection with the slide aforesaid.

5. A log-turner comprising a canter-head of approximately triangular form hook-pointed at the apex, pitmen having ends thereof in pivotal connection with said head, piston-rods with which the other ends of the pitmen are in pivotal connection, oscillative cylinders in which the rods aforesaid are reciprocative, a slide and vertical guide for same, a segment-projection of one of the pitmen, and a link by which adjustable connection is had of the other pitman with the seg-

ment-projection of the one aforesaid, a pivot-pin joining the link and pitman-projection being in connection with the slide aforesaid.

6. A log-turner comprising a canter-head of approximately triangular form hook-pointed at the apex, a pair of pitman each in pivotal connection with the head, actuating mechanism for the pitmen, and means controlling the movement of said pitmen to effect a combined forward pull and rock of the canter-head in proportion to the roll of the log turned by same, whereby the relative position of said head with respect to said log remains the same throughout the turning operation and pressure is exerted against the aforesaid log toward adjacent head-blocks.

7. A log-turner comprising a canter-head of approximately triangular form hook-pointed at the apex in opposite directions, one of its sides being curvilinear and the other straight; and means in conjunction with said head to present either side of same to the log, and to vary the manipulation of said head with respect to turning the log or for supporting and lowering a plank cut therefrom.

In testimony that I claim the foregoing I have hereunto set my hand at Ashland, in the county of Ashland and State of Wisconsin in the presence of two witnesses.

DONALD A. KENNEDY.

Witnesses:

J. D. KENNEDY,

DAVID McGRATH.

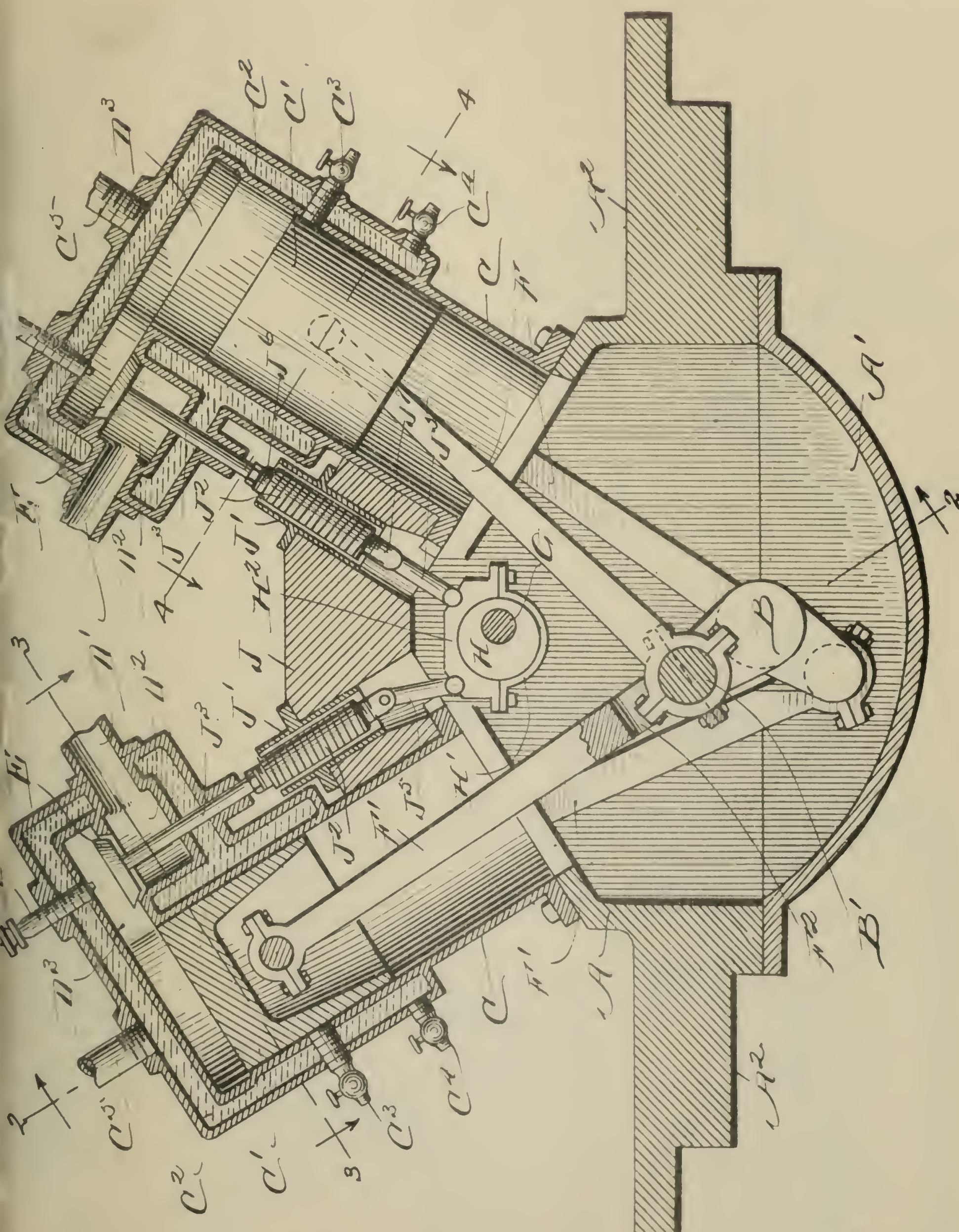
875,297. PATENTED DEC. 31, 1907.

G. W. STANLEY.

GASOLENE ENGINE.

APPLICATION FILED AUG. 20, 1906

3 SHEETS—SHEET 1.



Inventor

G. W. Stanley.

nesses

D. Blondel

B. McBath

By Oliver & Brock

Attorneys

271

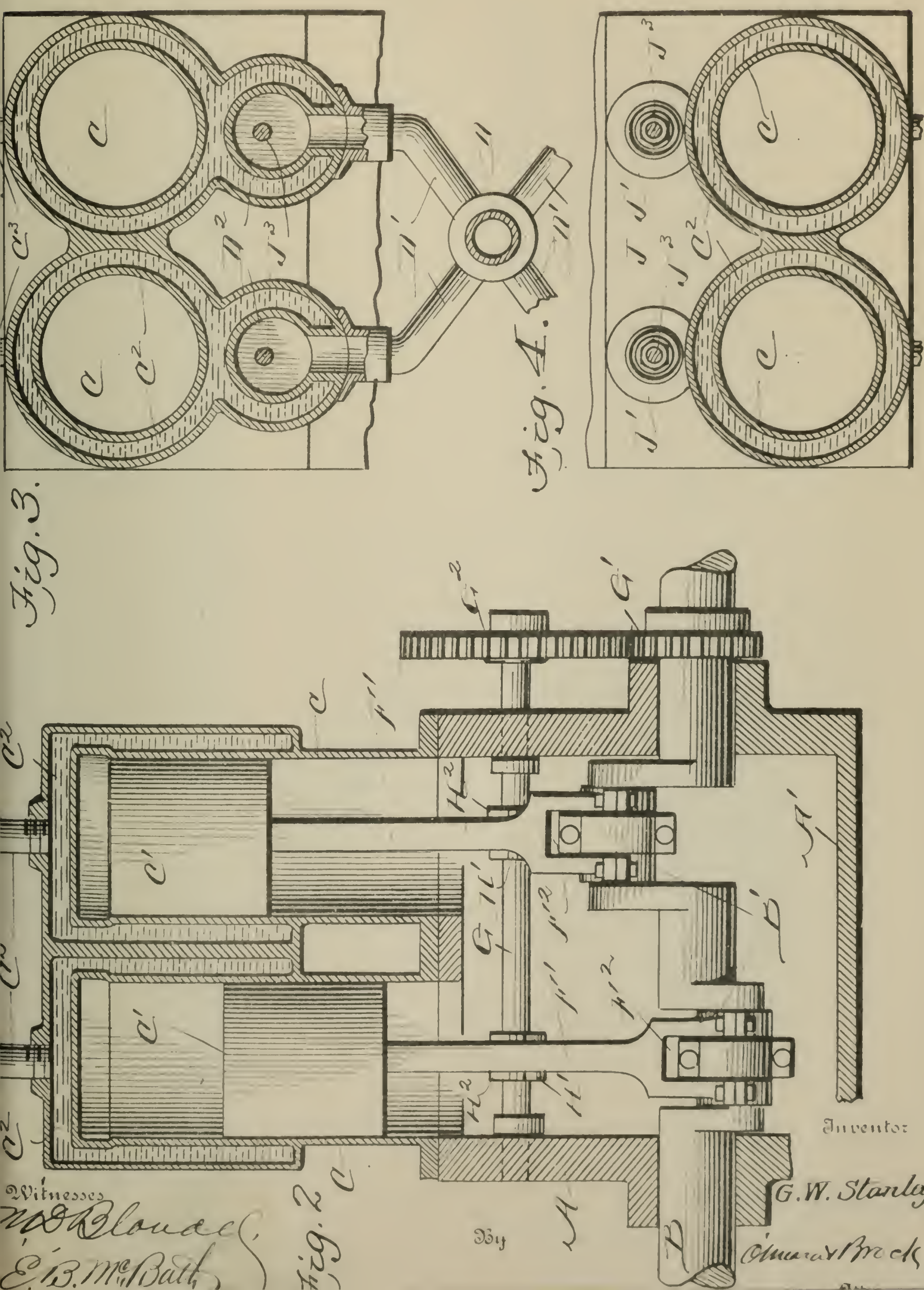
No. 875,297. PATENTED DEC. 31, 1907.

G. W. STANLEY.

GASOLENE ENGINE.

APPLICATION FILED AUG. 20, 1906.

3 SHEETS—SHEET 2.



Witnesses

Inventor

G. W. Stanley

By

No. 875,297. PATENTED DEC. 31, 1907.

G. W. STANLEY.

GASOLENE ENGINE.

APPLICATION FILED AUG. 20, 1906.

3 SHEETS—SHEET 3.

Fig. 5.

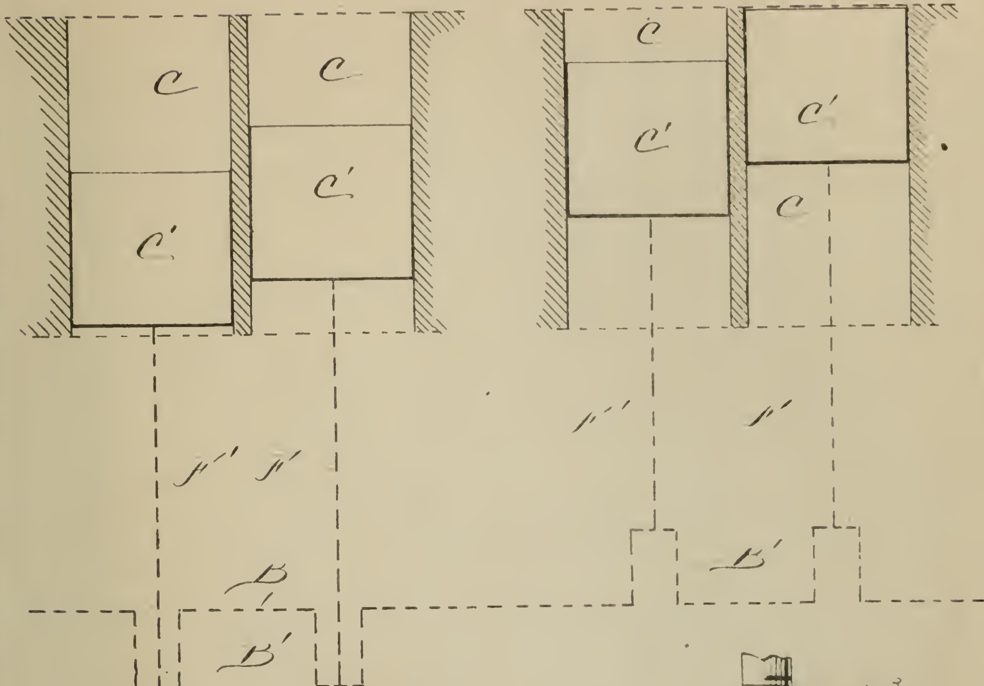


Fig. 6.

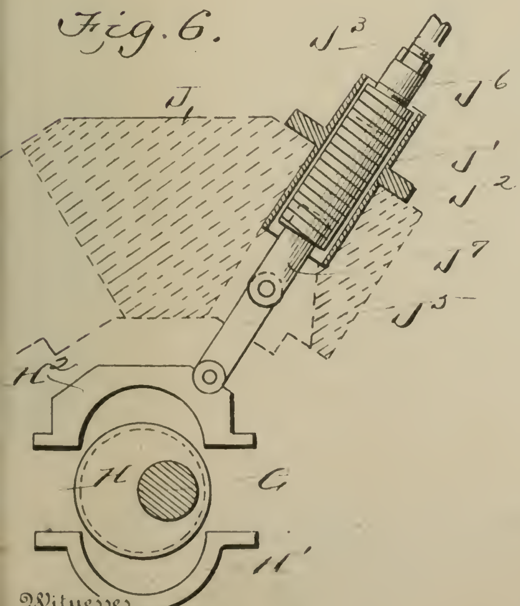
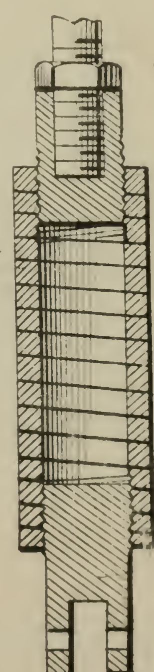


Fig. 7.



Witnesses

W. D. Blondel

E. B. McBath

Inventor

G. W. Stanley.

By Oliver & Brock

Attorneys

UNITED STATES PATENT OFFICE.

GEORGE W. STANLEY, OF LOGANSPORT, INDIANA, ASSIGNOR OF ONE-EIGHTH TO GEORGE D. MILLER, ONE-EIGHTH TO ERNEST A. TUCKER, ONE-EIGHTH TO ARTHUR E. STANLEY, ONE-EIGHTH TO FREDERICK H. KLINSICK, AND ONE-EIGHTH TO WILLIAM D. CRAIG, OF LOGANSPORT, INDIANA.

GASOLENE-ENGINE.

No. 875,297. **Specification of Letters Patent.** **Patented Dec. 31, 1907.**

Application filed August 20, 1906. Serial No. 331,352.

To all whom it may concern:

Be it known that I, George W. Stanley, a citizen of the United States, residing at Logansport, in the county of Cass and State of Indiana, have invented a new and useful Improvement in a Gasolene-Engine, of which the following is a specification.

This invention relates to gasolene engines and has for its object an engine of this type in which an increased amount of power may be obtained without a proportionate increase in size, weight, and cost of the engine, and a further object of the invention is to reduce the amount of friction to a minimum by reducing the number of bearings and to also obtain a very light and compact engine. In engines of this kind it is common to have on a four cylinder engine, nine bearings and on a six cylinder engine, thirteen bearings. I have reduced this number to five and seven respectively, and this not only reduces the amount of friction but also enables me to shorten the length of the casings and of the drive shaft and thereby obtain a very light engine for the number of cylinders used.

The invention consists of the novel features of construction, hereinafter fully described, pointed out in the claims and shown in the accompanying drawings, in which,

Figure 1 is a vertical sectional view taken longitudinally through one set of oppositely disposed cylinders, and transverse through the casing and one wrist pin. Fig. 2 is a section on the line 2—2 of Fig. 1. Fig. 3 is a section on the line 3—3 of Fig. 1. Fig. 4 is a section on the line 4—4 of Fig. 1. Fig. 5 is a diagrammatic view illustrating the relative positions of the pistons in the respective cylinders, and the relative angle of the crank portions of the driving shaft. Fig. 6 is a detail sectional view through a small portion of the casing and through a guide sleeve illustrating the construction of a valve moving mechanism parts being detached. Fig. 7 is a longitudinal section through a coil spring and attached parts, the parts being shown in elevation in Fig. 6.

In these drawings I have illustrated my invention as applied to a four cylinder engine, although it will be understood that it can be applied to any multiple of a two cylinder engine which may be desired by the addition of the extra cylinders and the parts necessary to coact with them.

In these drawings, A represents a casing which is provided with a detached or separate bottom portion A′, and the casing A is provided upon opposite sides with arms A^2 by means of which it can be mounted or secured in place.

Upon the casing A are mounted two sets of cylinders C the cylinders of each set being arranged out of the perpendicular at an angle of about thirty-two degrees and the two sets being oppositely arranged. Each cylinder is provided with piston C″ and is surrounded by a water jacket C^2 and is also provided with an exhaust nozzle C^3 and each water jacket is provided with a drain pipe C^4 and a supply pipe C^5.

Passing longitudinally through the casing A is a driving or power shaft B, provided in the case of a four cylinder engine with two cranked portions, each of which has a wrist pin B′. A fluid vapor pipe D supplies each of the four cylinders by means of four branch pipes D′. These fluid vapor inlet pipes D′ open into a chamber D^2 formed upon one side of the cylinder proper and this chamber opens into an igniting chamber D^3 formed at the upper ends of the cylinders and communicating with the clearance space. A suitable igniting or firing pin D^4 ignites the vapor passed into the chambers D^3. Communication between the chambers D^2 and D^3 is controlled by a suitable check valve E which cooperates with a suitable valve seat formed between said chambers.

To the piston C″ of one set of cylinders C are pivotally connected pitman rods F, and to the pistons C″ of the other set of cylinders are pivotally connected pitman rods F′, which are slotted at their lower ends as shown at F^2 and a pitman F is pivotally connected to each of the wrist pins B′ within the bifurcation F^2 of one of the rods F′, so that to each wrist pin B′ are pivoted two pitmen of one of the sets of cylinders C.

It will be obvious therefore that as the cylinders C are arranged in oppositely disposed sets the same holds true of the pistons. To distinguish more clearly between these sets the piston rods of one set are designated by the reference letter F and of the other set by the reference letter F′, the construction being the same. The wrist pins B′ are also disposed at angles of ninety degrees apart and the various pistons will therefore occupy at

any given time different positions in their various cylinders.

As shown in Fig. 5 as one of the pistons is upon the point of commencing a stroke upwardly, in a cylinder of one set, a piston of an oppositely arranged cylinder, that is, in the other set, has made one fourth of the stroke, the adjacent piston C′ has made one-half of a stroke and the piston C′ in the remaining cylinder of the last mentioned set, has completed a stroke, and it will be also observed from said diagram that as a piston to which is connected a pitman rod F is ending its stroke, a second piston to which is connected a piston rod F and which therefore belongs to the same set of cylinders, has only made one-fourth of a stroke, while a piston C′ to which a rod F′ is connected is commencing a stroke and a remaining piston also connected to a rod F′ has completed one-half of its stroke.

To regulate the admission of vapor from the pipes D′ into the igniting chambers D^3, the following mechanism is employed:—A shaft G is arranged above and parallel to the shaft B and there is mounted upon this shaft a gear wheel G^2 which meshes with a gear wheel G′ carried by the shaft B, the gear wheel G^2 being twice the size of the gear wheel G′ and making one revolution to two revolutions of the gear wheel G′. The shaft G carries two eccentrics H, which are provided with an eccentric strap H′ and a block H^2, the block H^2 forming the upper half of the strap. A suitable casting J is formed upon the casing A between the two sets of cylinders and in this casting which is suitably cut out are arranged a plurality of guide sleeves J′ one for each valve E and within the sleeves J′ are loosely placed close coil springs J^2 which are connected at their upper ends to the valve stems J^3 and at their lower ends to links J^5 which are pivotally connected to ends of the blocks H^2. In Figs. 6 and 7 I have shown the details of construction of these parts and it will be noted that the spring J^2 has a plug J^6 threaded into its upper end and into this plug is threaded the lower end of the valve stem J^3, a suitable nut being used to lock the same in place. A bifurcated plug J^7 is threaded into the lower end of the spring J^2 and in the bifurcation of the plug J^7 is pivoted the upper end of one of the links J^5. It will be understood that two of the links J^5 are connected to each of the blocks H^2 and to opposite ends of the said block, and that they actuate valves E in opposing cylinders. As the eccentric H rotates it will lift the ends of the block H^2 alternately, and it will also be noted that the sleeves J′ are arranged parallel to the cylinders and therefor at an angle to the block H^2 which is arranged in a horizontal plane and transverse to the shaft G. By reason of this construction the eccentric H will give an upward thrust to the valve E of one of the cylinders and then an upward thrust to the valve E of the opposing cylinder, and as the valve actuating mechanism includes a spring, the valve will be positively opened, by the thrust of the eccentric and positively closed by the block H^2 aided by the spring, as the tendency of the springs J^2 are to force the block H^2 down upon the periphery of the eccentric H.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. The combination with an engine having cylinders arranged in oppositely disposed sets, pistons in said cylinders, a power shaft, piston rods connected to said power shaft, a parallel shaft driven from the power shaft, valve chambers carried by the cylinders, valves in said chambers, eccentrics on the second mentioned shaft, blocks on the eccentrics, straps holding the blocks in place, and means for pivotally connecting two valves of oppositely disposed cylinders to the same block.

2. In a multi-cylinder engine, cylinders arranged in oppositely disposed sets, pistons, piston rods, a common crank shaft, a second shaft, driven from the crank shaft, eccentrics thereon, blocks on the eccentrics, valve casings carried by the cylinders, valves therein, valve stems, springs connected to the valve stems, and links pivotally connecting the springs to the blocks, valves of opposite sets being connected to the same.

3. A valve mechanism for multi-cylinder engines comprising an eccentric, a block fitting thereon, a strap connected to the corners of the block, valves, said valves being carried by the oppositely disposed cylinders, valve stems, closed coiled springs connected to the outer end of the stems and links each pivotally connected at one end to a spring and at the opposite end to one of the remaining corners of the blocks.

GEORGE W. STANLEY.

Witnesses:

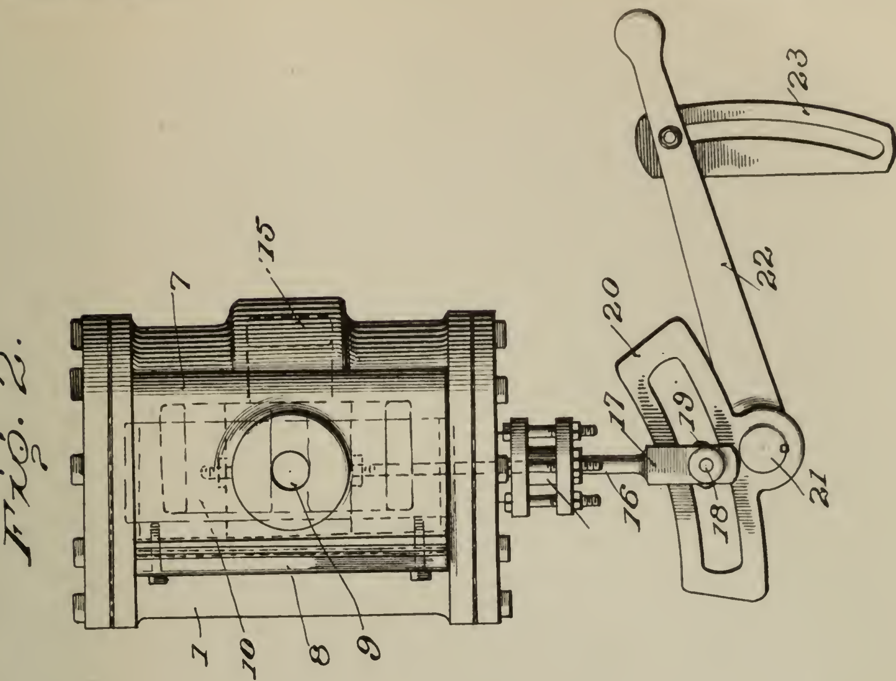
W. B. SCHRIER,
THOMAS J. MCELHENY.

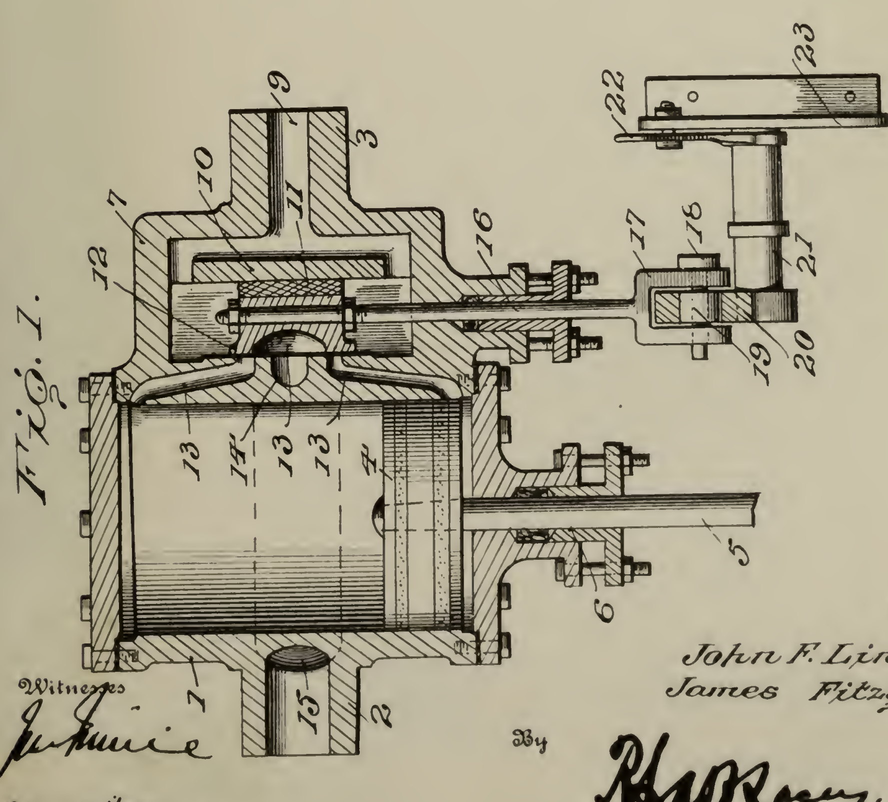
J. F. LINDBERG & J. FITZGERALD.

OSCILLATING ENGINE.

APPLICATION FILED FEB. 26, 1908.

905,721. Patented Dec. 1, 1908.





Witnesses

W. N. Woodson

Inventors

John F. Lindberg

James Fitzgerald

By

Attorneys

any given time different positions in their various cylinders.

As shown in Fig. 5 as one of the pistons is upon the point of commencing a stroke upwardly, in a cylinder of one set, a piston of an oppositely arranged cylinder, that is, in the other set, has made one fourth of the stroke, the adjacent piston C′ has made one-half of a stroke and the piston C′ in the remaining cylinder of the last mentioned set, has completed a stroke, and it will be also observed from said diagram that as a piston to which is connected a pitman rod F is ending its stroke, a second piston to which is connected a piston rod F and which therefore belongs to the same set of cylinders, has only made one-fourth of a stroke, while a piston C′ to which a rod F′ is connected is commencing a stroke and a remaining piston also connected to a rod F′ has completed one-half of its stroke.

To regulate the admission of vapor from the pipes D′ into the igniting chambers D^3, the following mechanism is employed:—A shaft G is arranged above and parallel to the shaft B and there is mounted upon this shaft a gear wheel G^2 which meshes with a gear wheel G′ carried by the shaft B, the gear wheel G^2 being twice the size of the gear wheel G′ and making one revolution to two revolutions of the gear wheel G′. The shaft G carries two eccentrics H, which are provided with an eccentric strap H′ and a block H^2, the block H^2 forming the upper half of the strap. A suitable casting J is formed upon the casing A between the two sets of cylinders and in this casting which is suitably cut out are arranged a plurality of guide sleeves J′ one for each valve E and within the sleeves J′ are loosely placed close coil springs J^2 which are connected at their upper ends to the valve stems J^3 and at their lower ends to links J^5 which are pivotally connected to ends of the blocks H^2. In Figs. 6 and 7 I have shown the details of construction of these parts and it will be noted that the spring J^2 has a plug J^6 threaded into its upper end and into this plug is threaded the lower end of the valve stem J^3, a suitable nut being used to lock the same in place. A bifurcated plug J^7 is threaded into the lower end of the spring J^2 and in the bifurcation of the plug J^7 is pivoted the upper end of one of the links J^5. It will be understood that two of the links J^5 are connected to each of the blocks H^2 and to opposite ends of the said block, and that they actuate valves E in opposing cylinders. As the eccentric H rotates it will lift the ends of the block H^2 alternately, and it will also be noted that the sleeves J′ are arranged parallel to the cylinders and therefor at an angle to the block H^2 which is arranged in a horizontal plane and transverse to the shaft G. By reason of this construction the eccentric H will give an upward thrust to the valve E of one of the cylinders and then an upward thrust to the valve E of the opposing cylinder, and as the valve actuating mechanism includes a spring, the valve will be positively opened, by the thrust of the eccentric and positively closed by the block H^2 aided by the spring, as the tendency of the springs J^2 are to force the block H^2 down upon the periphery of the eccentric H.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. The combination with an engine having cylinders arranged in oppositely disposed sets, pistons in said cylinders, a power shaft, piston rods connected to said power shaft, a parallel shaft driven from the power shaft, valve chambers carried by the cylinders, valves in said chambers, eccentrics on the second mentioned shaft, blocks on the eccentrics, straps holding the blocks in place, and means for pivotally connecting two valves of oppositely disposed cylinders to the same block.

2. In a multi-cylinder engine, cylinders arranged in oppositely disposed sets, pistons, piston rods, a common crank shaft, a second shaft, driven from the crank shaft, eccentrics thereon, blocks on the eccentrics, valve casings carried by the cylinders, valves therein, valve stems, springs connected to the valve stems, and links pivotally connecting the springs to the blocks, valves of opposite sets being connected to the same.

3. A valve mechanism for multi-cylinder engines comprising an eccentric, a block fitting thereon, a strap connected to the corners of the block, valves, said valves being carried by the oppositely disposed cylinders, valve stems, closed coiled springs connected to the outer end of the stems and links each pivotally connected at one end to a spring and at the opposite end to one of the remaining corners of the blocks.

GEORGE W. STANLEY.

Witnesses:

W. B. Schrier,

Thomas J. McElheny.

275

J. F. LINDBERG & J. FITZGERALD.

OSCILLATING ENGINE.

APPLICATION FILED FEB. 26, 1908.

905,721.

Patented Dec. 1, 1908.

Fig. 2.

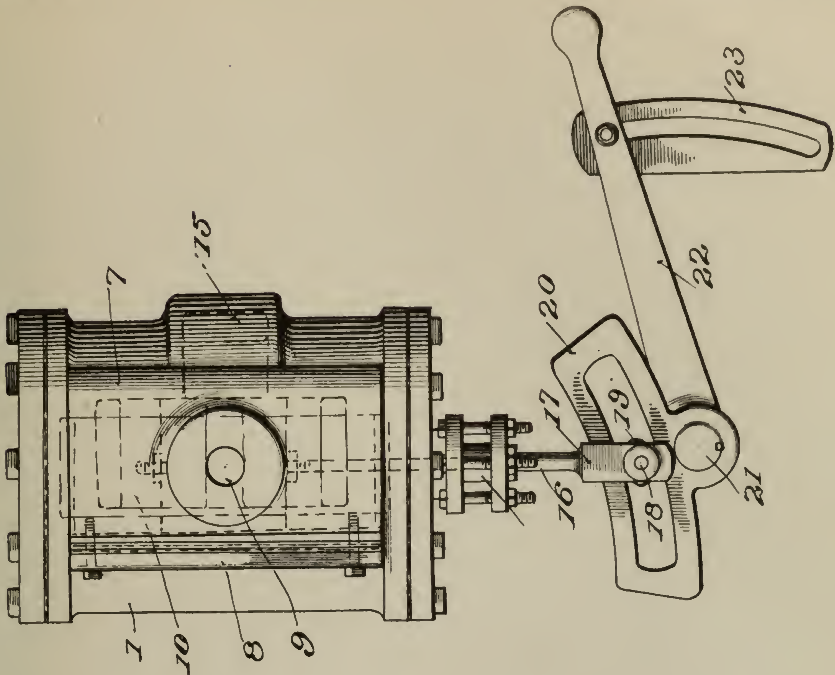
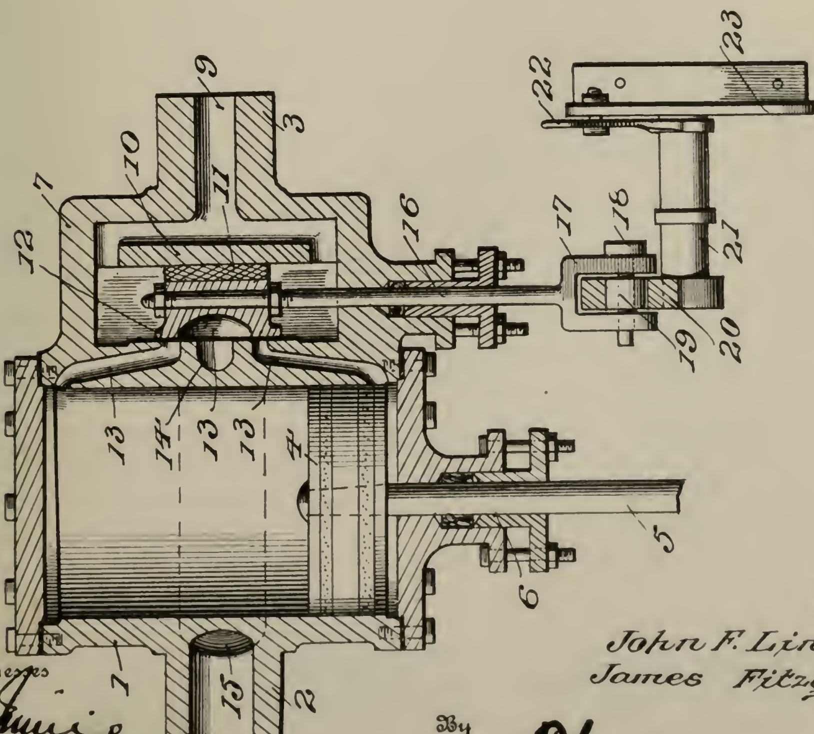


Fig. 1.



Witnesses

W. N. Woodson

Inventors

John F. Lindberg

James Fitzgerald

By

Attorneys

276

UNITED STATES PATENT OFFICE.

JOHN F. LINDBERG AND JAMES FITZGERALD, OF HIBBING, MINNESOTA.

OSCILLATING ENGINE.

No. 905,721. Specification of Letters Patent. Patented Dec. 1, 1908.

Application filed February 26, 1908. Serial No. 417,887.

To all whom it may concern:

Be it known that we, John F. Lindberg and James Fitzgerald, citizens of the United States, residing at Hibbing, in the county of St. Louis and State of Minnesota, have invented certain new and useful Improvements in Oscillating Engines, of which the following is a specification.

This invention comprehends certain new and useful improvements in the art of steam engineering and the invention has for its primary object an improved construction of engine cylinder of the oscillating type in which is embodied a valve chest with a slide valve mounted therein, the parts being so arranged that a reciprocating motion will be imparted to the slide valve to properly admit steam to the cylinder as the same oscillates.

With these and other objects in view as will more fully appear as the description proceeds, the invention consists in certain constructions, arrangements and combinations of the parts that we will hereinafter fully describe and claim.

For a full understanding of the invention, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a sectional view of our improved oscillating engine cylinder and steam chest; and, Fig. 2 is a side elevation thereof at right angles to Fig. 1.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

Referring to the drawings, the numeral 1 designates an oscillating steam engine cylinder, and 2 and 3 the trunnions on which said cylinder is mounted to oscillate.

4 designates the piston, and 5 the piston rod which extends out through the stuffing box 6 in one head of the cylinder.

The valve chest 7 of our invention is incorporated with the cylinder 1 and provided with a side-opening cover 8 so that the slide valve and its concomitant parts may be inserted or removed. The valve chest 7 is interposed between the body of the cylinder and the trunnion 3, as clearly illustrated in the drawing, and said trunnion is hollow as shown to provide the steam inlet port 9 which diverges and opens into the valve chest 7 at the ends of the wall 10. This wall serves as a bearing for the wear plate 11 and as a balance plate for the slide valve 12. Steam from the chamber formed in the valve chest 7 passes into the cylinder 1 through the oppositely extending inlet passages 13, and the steam exhausts through the port 14 and its connecting port 15 which opens into the hollow trunnion 2.

The valve rod 16 is secured at one end to the slide valve 12 and passes out through a stuffing box in the valve chest 7, the outer end of the valve rod being forked in the present instance as indicated at 17. A pin 18 extends through the members of the fork and secures a roller 19 therein, said roller being accommodated in a slot in a quadrant 20, the fork 17 straddling said quadrant. The quadrant 20 is mounted upon a shaft or axis 21 which is supported by any suitable means, not shown, and a handle lever 22 is connected to said shaft and is arranged for adjustable connection with a latch plate 23, as by a clamp or set screw.

From the foregoing description in connection with the accompanying drawings, it will be evident that as the cylinder oscillates on its trunnions 2 and 3, the slide valve 12 will have imparted to it a reciprocating motion, through the instrumentality of the valve rod 16 and its cam-like engagement with the quadrant 20. By having the quadrant 20 adjustable on the axis 21, the handle 22 may be moved so as to swing the quadrant and incline it in an opposite direction from that shown in the drawing whereby to reverse the engine.

Having thus described the invention, what is claimed as new is:

The combination with an oscillating engine cylinder and a steam chest secured thereto and provided at one end with a stuffing box, of a balanced slide valve mounted in said chest, a rigid valve rod connected rigidly to said valve at one end and passing outwardly through the stuffing box in which it has longitudinal movement, the valve rod being formed at its outer end with a fork, a quadrant provided with a slot and straddled by said fork, a roller journaled in said fork

and received in the slot of said quadrant, a shaft upon which said quadrant is mounted, the shaft being arranged to turn about its longitudinal axis whereby to change the position of the quadrant, a handle rigidly connected at one end to said shaft, and a slotted latch plate with which the other end of said handle is connected.

In testimony whereof we affix our signatures in presence of two witnesses.

JOHN F. LINDBERG. [L. S.]
JAMES FITZGERALD. [L. S.]

Witnesses:
A. P. SILLIMAN,
T. S. SILLIMAN.

W. H. KRATSCH.

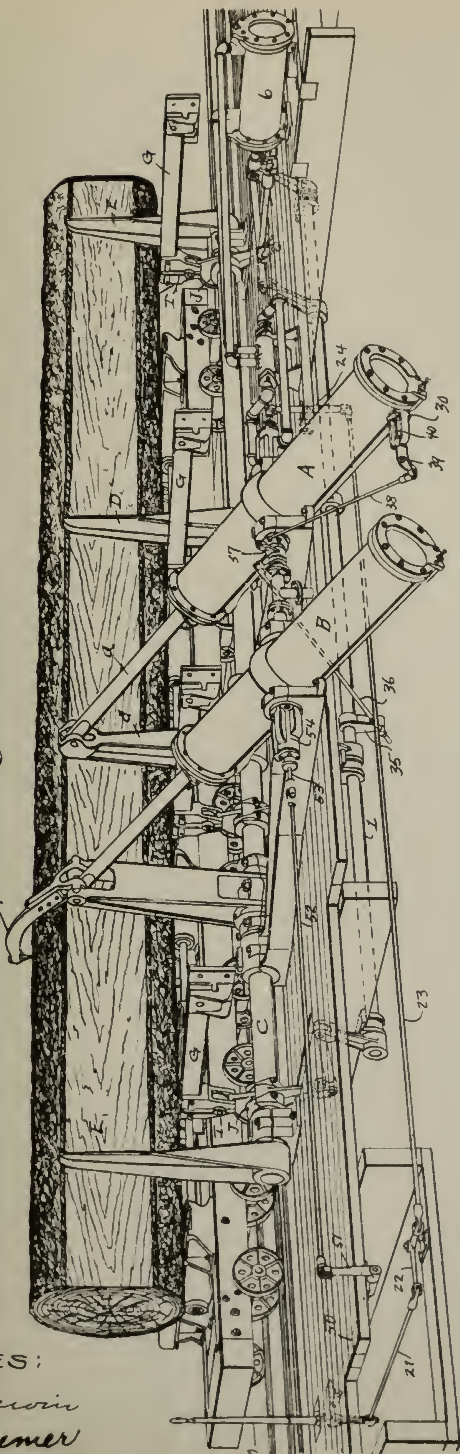
SKID LIFTING DEVICE.

APPLICATION FILED MAR. 13, 1909.

92,212. Patented May 16, 1911.

4 SHEETS—SHEET 1.

Fig. 1.



ITNESSES:

O. R. Erwin

L. D. Bremer

INVENTOR

William H. Kratsch

By Erwin & Wheeler

ATTORNEYS.

W. H. KRATSCH.

SKID LIFTING DEVICE.

APPLICATION FILED MAR. 13, 1909.

992,212.

Patented May 16, 1911.

4 SHEETS—SHEET 2.

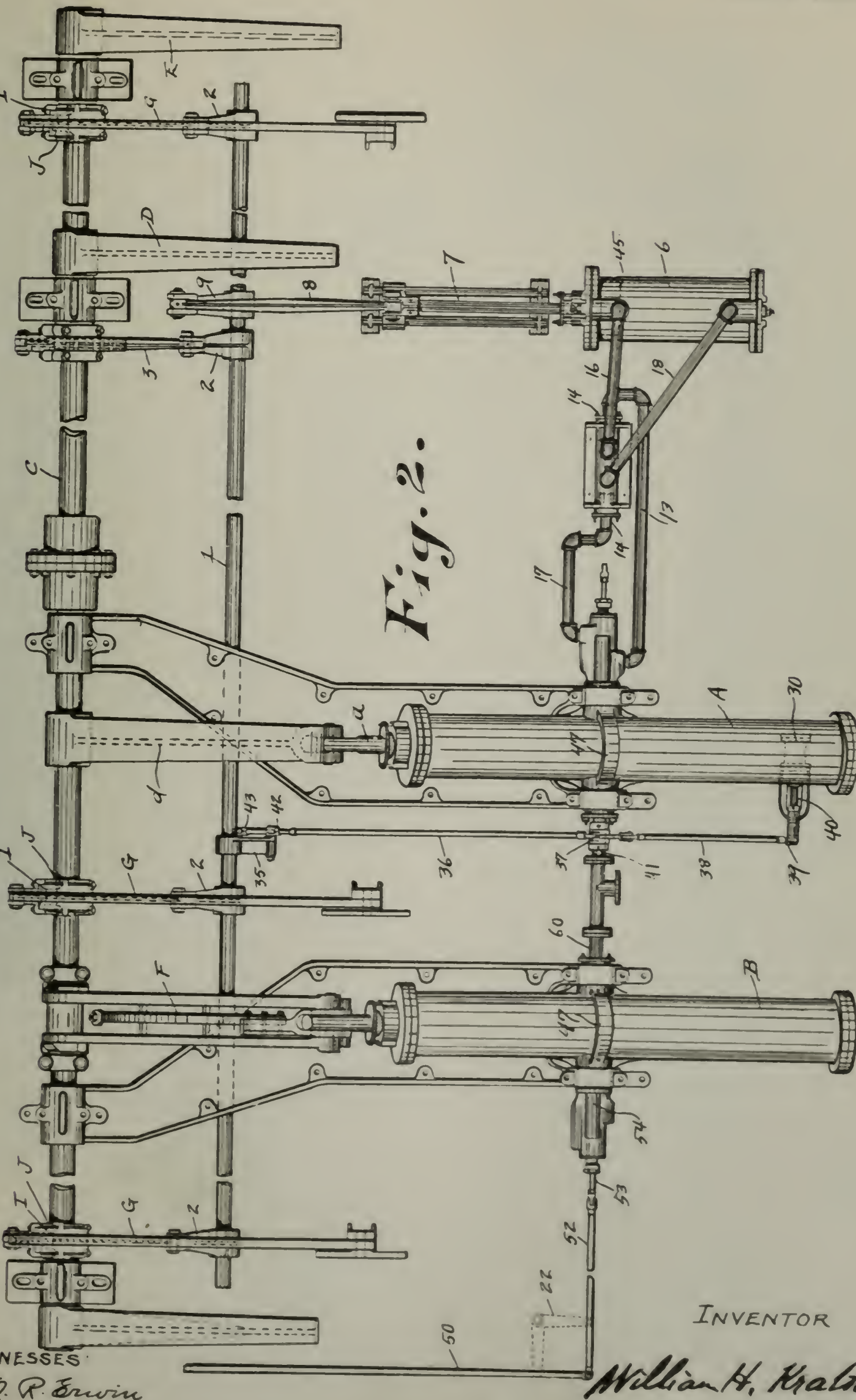


Fig. 2.

WITNESSES:

O. R. Erwin

F. D. Bremer

INVENTOR

William H. Kratsch

By Erwin & Wheeler

W. H. KRATSCH.

SKID LIFTING DEVICE.

APPLICATION FILED MAR. 13, 1909.

280

992,212. Patented May 16, 1911.

4 SHEETS—SHEET 3.

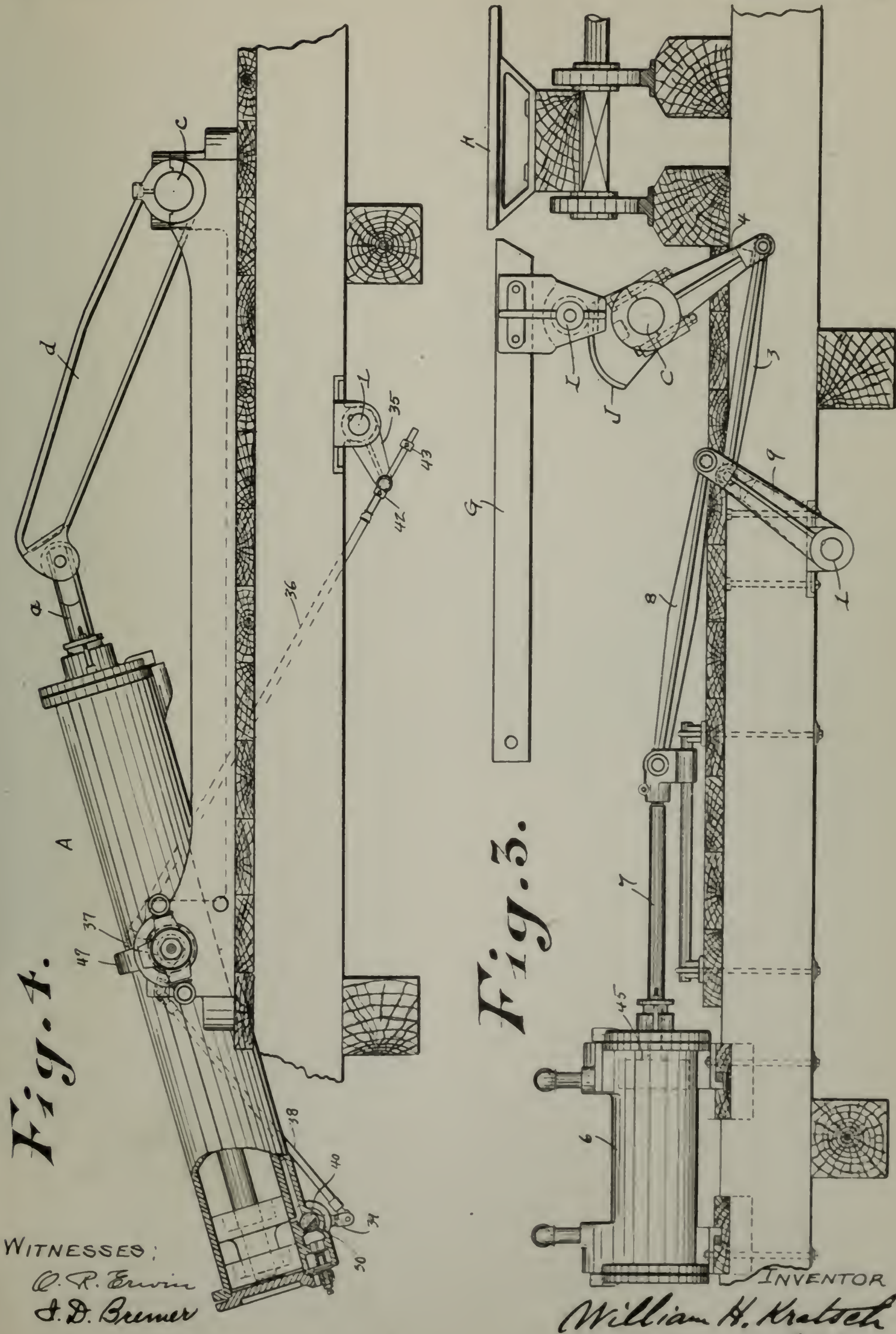


Fig. 4.

Fig. 3.

WITNESSES:

O. R. Erwin

S. D. Bremer

INVENTOR

William H. Kratsch

By Erwin & Wheeler

ATTORNEYS.

W. H. KRATSCH.

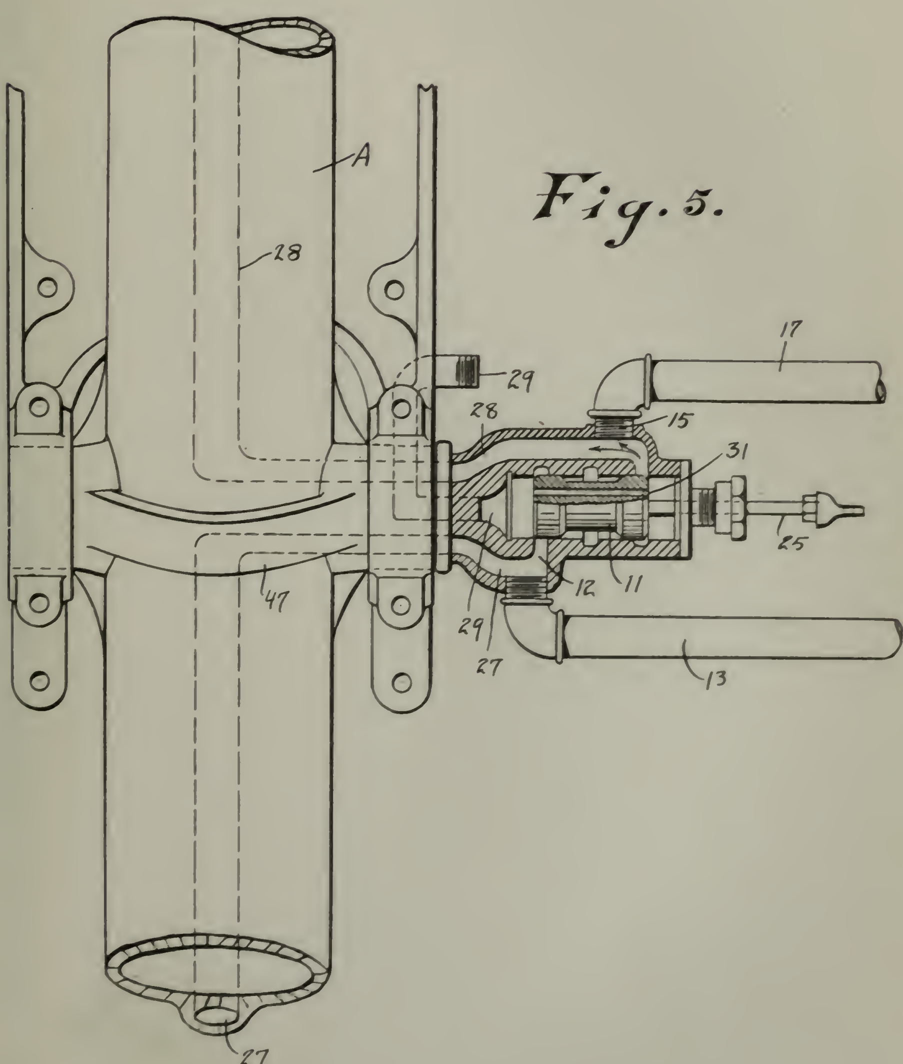
SKID LIFTING DEVICE.

APPLICATION FILED MAR. 13, 1909.

992,212.

Patented May 16, 1911.

4 SHEETS—SHEET 4.



WITNESSES:

O. R. Erwin

J. D. Bremer

INVENTOR

William H. Kratsch

By Erwin & Wheeler

ATTORNEYS

UNITED STATES PATENT OFFICE.

WILLIAM H. KRATSCH, OF OSHKOSH, WISCONSIN, ASSIGNOR TO CHALLONER COMPANY, OF OSHKOSH, WISCONSIN, A CORPORATION OF WISCONSIN.

SKID-LIFTING DEVICE.

992,212. Specification of Letters Patent. Patented May 16, 1911.

Application filed March 13, 1909. Serial No. 483,171.

To all whom it may concern:

Be it known that I, WILLIAM H. KRATSCH, a citizen of the United States, residing at Oshkosh, county of Winnebago, and State of Wisconsin, have invented new and useful Improvements in Skid-Lifting Devices, of which the following is a specification.

My invention relates to improvements in skid lifting devices for log loading and turning machines.

The object of my invention is to provide automatic means for lifting the skids preparatory to the loading operation, in which the operation of the log loading means will be dependent upon the operation of the skid lifting means, or the two mechanisms rendered so interdependent that they can be operated in sequence through the medium of a single controlling lever, and preferably through a single operation of such lever.

In the following description, reference is had to the accompanying drawings, in which—

Figure 1 is a perspective view of a log loading and turning machine embodying my invention. Fig. 2 is a plan view of a portion of such machine, showing the steam cylinders and the arrangement of the pipe connections for the auxiliary or skid lifting cylinder. Fig. 3 is a side view of the auxiliary or skid lifting cylinder and its skid lifting connections. Fig. 4 is a side view of the log loading cylinder, with the valve casing and a portion of the cylinder partially broken away to show the arrangement of the ports. Fig. 5 is a detail plan view of a portion of the log loading cylinder, showing the main steam controlling valve casing and ports in horizontal section.

Like parts are identified by the same reference characters throughout the several views.

My invention is illustrated as applied to a log loading machine of the type known as the Simonson log loader and turner, in which a rocking engine cylinder A is employed to oscillate a rock shaft C by means of piston rod *a* and arm *d*, thus swinging the log loading arms D and E,—another steam cylinder B being employed to operate a log turning hook F. These general features are all shown and described in U. S. patents to Simonson, numbered 408,760, and 448,593, and are therefore not herein more specifically described.

The skids G are ordinarily supported at the ends nearest the carriage H by means of blocks I and cams J, which are mounted to oscillate upon the rock shaft C. In my improved structure, these cams are free to oscillate independently of the shaft C and are actuated from a back shaft 1 through arms 2 which are fast thereon, links 3, and arms 4, the latter being connected with the respective cams. The cams, in one position, support the skids at or a little above the level of the carriage H, and in another position permit the skids to drop below such level at the ends adjacent to the carriage.

The back shaft 1 is actuated from the auxiliary cylinder 6 through its piston rod 7, connecting rod 8, and a crank arm 9 carried by the back shaft. A steam controlling valve at 11 is adapted to admit steam to the inner end of cylinder 6, through port 12, flexibly jointed pipe 13, coupling member 14, and pipe 16. When actuated in the other direction from normal position, this valve admits steam to the other end of cylinder 6 through port 15, flexibly jointed pipe 17, coupling member 14 and pipe 18. The controlling valve is actuated from a lever 20, through a rod 21, bell crank 22, rod 23, lever 24, and valve stem 25, whereby the valve may be adjusted to admit steam to either of the pipes 13 or 17, or to a central closed or normal position.

The steam cylinder A is provided with steam passages 27 and 28 along its under side, the passage 27 leading from port 12 to the outer end of cylinder A, and the passage 28 leading from port 15 to the inner end of cylinder A, viz:—the end nearest the carriage. When in normal position, as shown in Fig. 5, both ports 12 and 15 may be respectively open to an exhaust passage 29 past the end of the valve and through a central passage 31 in the valve. In the other positions one port is open to the exhaust and the other to the live steam.

Valve 30 is actuated from the piston rod 7 of the auxiliary cylinder, through the connecting rod 8, back shaft 1, crank 35, rod 36, elbow crank 37, rod 38, crank 39, and valve stem 40, the elbow crank 37 being mounted to oscillate upon a shaft 41, upon which the cylinders A and B are pivoted. The crank 35 is slidingly connected with the rod 36, with stops 42 and 43 limiting its free motion, so that rod 36 is only actuated during the

final movement of the crank in either direction. It will therefore be observed that the admission of steam to the outer end of cylinder A is dependent entirely upon the movement of piston 45 in the auxiliary cylinder. The outward movement of this piston first lifts the skids, and as this movement is completed, the valve 30 is actuated to admit steam to the outer end of cylinder A and thus actuate the log loading arms. Conversely, a retractive movement of the piston 45 in the auxiliary cylinder first lowers the skids and then closes valve 30, the steam in cylinder A having in the meantime passed backwardly to port 12 and the exhaust. It is not material whether the admission of steam to the inner end of cylinder A is similarly controlled or not, since in the retractive movement, the skids may be lowered, either before or after the operation of the arms D and E.

By adjusting the stops 42 and 43 on the rod 36, the admission of steam to cylinder A through valve 30 may be made to take place at any desired period during the stroke of piston 45. The admission of steam to cylinder B is independent of the auxiliary or skid lifting cylinder, but is preferably controlled through a movement of the same manually actuated lever, which is pivoted to a rock shaft 50 and when swung laterally, rocks this shaft and transmits motion through a crank arm 51 and rod 52 to a valve stem 53 to operate a valve at 54 controlling the admission of steam to cylinder B. Steam is supplied to the chambers of the controlling valves 11 and 54, through pipes 60 and 41 and suitable passages in the yokes 47, which support cylinders A and B.

While I have referred to the motive fluid as steam, it is not material to my invention what fluid is used. The specific connections employed are also not essential, although it is desirable to employ some form of flexible steam conducting pipes for the auxiliary cylinder, in order that this cylinder may be permitted to remain in a stationary position while the casing of the controlling valve rocks with the cylinder A. It is not material to this invention, how the several cylinders are placed nor what connections are used to transmit motion from their respective pistons to the skids. The only essential feature of the construction is that the operation of the log loading means is made dependent upon the prior operation of the skid lifting or adjusting means.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a log loader provided with skid lifting devices, the combination with fluid operated loading means, of an auxiliary fluid chamber, a movable member therein operatively connected with the skid lifting devices, and means, operated from said movable member, for controlling the delivery of fluid to the log loading means.

2. In a log loader provided with movable skids, the combination with log loading mechanism, of fluid actuated skid lifting devices, and means, operatively connected therewith, which actuates the log loading mechanism after the initial skid lifting movement.

3. In a log loader provided with movable skids, the combination with skid lifting cams, and swinging log loading arms, of actuating mechanism for the skid lifting cams, other actuating mechanism for the log loading arms, and means, connected with the cam actuating mechanism, for controlling the operation of the log loading mechanism, whereby said skid lifting and log loading operations are performed in sequence.

4. In a log loader provided with movable skids and log loading devices, the combinaton of a log loading motor, and a skid lifting motor, a manually actuated lever controlling the operation of the last mentioned motor, and connections for transmitting power from said motor to control the operation of the log loading motor.

5. In a log loader provided with movable skids and log loading devices, the combination of a cylinder and piston for operating the log loading devices, another cylinder and piston for lifting the skids, a main valve controlling the admission of motive fluid to both cylinders, another valve also controlling the admission of motive fluid to the log loading cylinder, and connections for actuating said last mentioned valve from the piston of the skid lifting cylinder.

6. In a log loader provided with movable skids and log loading devices, the combination of a cylinder and piston for operating the log loading devices, another cylinder and piston for lifting the skids, a main valve controlling the admission of motive fluid to both cylinders, another valve also controlling the admission of motive fluid to the log loading cylinder, and connections for actuating said last mentioned valve from the piston of the skid lifting cylinder, together with a manually actuated lever for adjusting the first mentioned valve.

7. In a log loader provided with movable skids and log loading devices, the combination of a cylinder and piston for operating the log loading devices, another cylinder and piston for lifting the skids, a main valve controlling the admission of motive fluid to both cylinders, another valve also controlling the admission of motive fluid to the log loading cylinder, and connections for actuating said last mentioned valve from the piston of the skid lifting cylinder, together with a manually actuated lever for

adjusting the first mentioned valve, and a log turning mechanism, a cylinder and piston for operating the same, a valve controlling the admission of motive fluid to said cylinder and independent connections with said manually actuated lever for operating said valve, said connections being adapted only for the transmission of lever movements of a different character from those which actuate the valve controlling the skid lifting and log loading mechanism.

8. In a log loader, the combination with a set of movable skids, and a set of swinging log loading arms, of fluid receiving cylinders, a piston in one of said cylinders operatively connected with the log loading arms, a piston in another of said cylinders, suitable devices operatively connected therewith and adapted to lift the skids, and a single manually actuated device arranged by movement in one direction to control the admission of fluid, first to one of said cylinders and then to the other.

9. In a log loader, the combination with a set of movable skids, and a set of swinging log loading arms, of fluid receiving cylinders, a piston in one of said cylinders operatively connected with the log loading arms, a piston in another of said cylinders, suitable devices operatively connected therewith and adapted to lift the skids, a single manually actuated device and operating connections controlled thereby for the admission of fluid to the skid lifting and log loading cylinders in sequence; said manually actuated device and its connections being arranged to necessarily admit said fluid, first to the cylinder containing the skid lifting piston and then to the other of said cylinders.

In testimony whereof I affix my signature in the presence of two witnesses.

WM. H. KRATSCH.

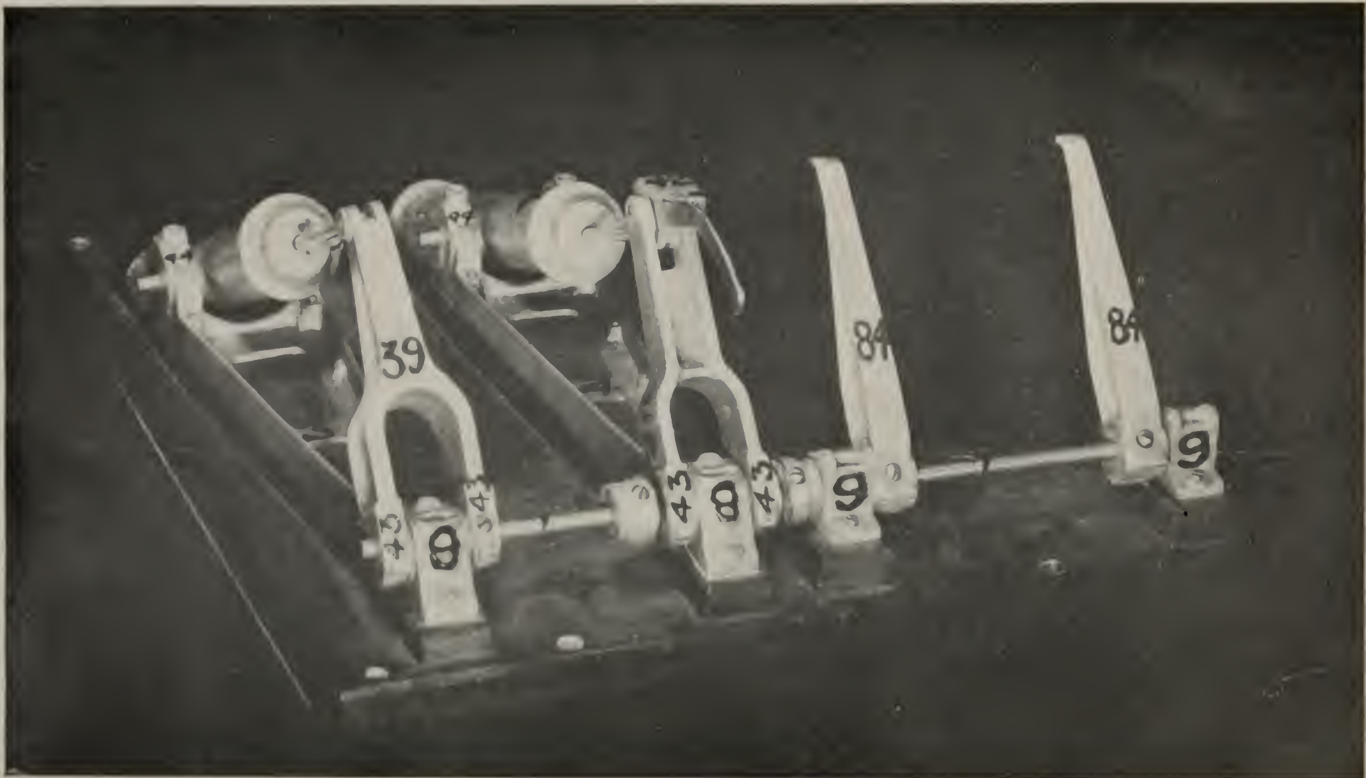
Witnesses:

EDWARD J. DEMPSEY,

BART W. HEISS.

Photographic Reproduction of Model of Cleveland Log Turner

PLAINTIFF'S EXHIBIT 10



Reproduction of Page 85 of The Timberman of March, 1912

PLAINTIFF'S EXHIBIT 16

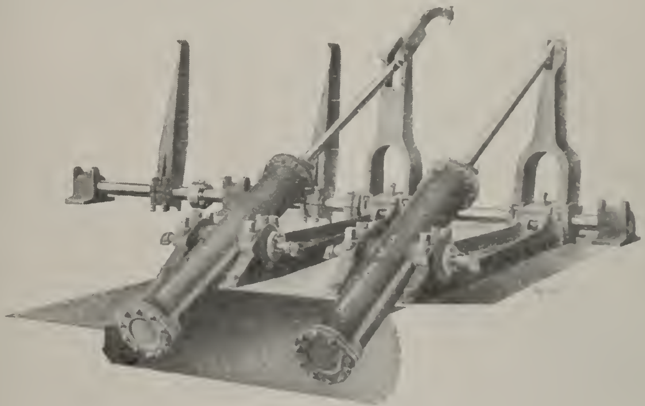
HAZARD

HAZARD MANUFACTURING COMPANY
WILKES-BARRE. PENNA.
NEW YORK 50 DEY ST. PITTSBURG, 2 CONESTOGA BUILDING CHICAGO, 4 WEST ADAMS ST

MARSHALL-WELLS HARDWARE CO., Portland, Ore., Seattle, Wash., Spokane, Wash., Agents

HAZARD
SPECIAL
PLOUGH
STEEL
WIRE ROPE
"OLYMPIC BRAND"

LOGGING
PURPOSES



CLEVELAND'S IMPROVED

SIMONSON LOG TURNER

WITH INDEPENDENT STEAM SKID LIFT

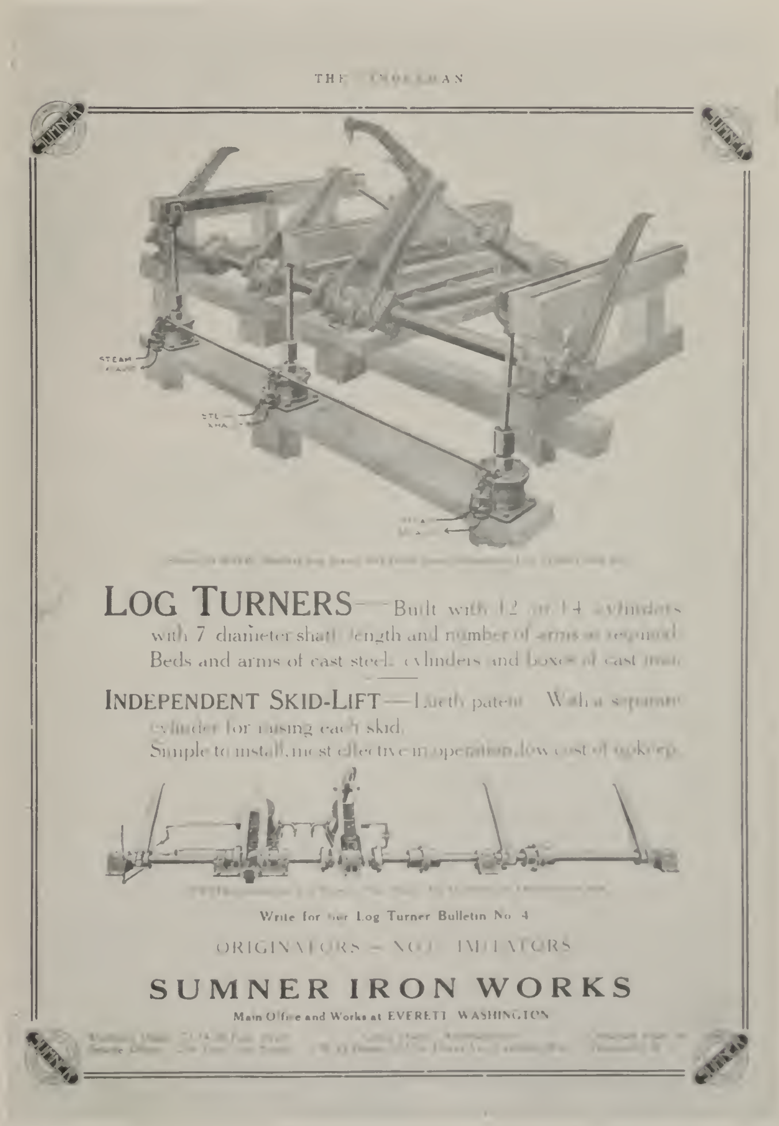
No leaky trunnions, because valves are placed below the floor timbers. Note the straight steel bed plates and forked hook and push arms. If you are going to put in a Turner, better get the best and latest improved.

GIDDINGS & LEWIS MFG. CO.

FOND DU LAC, WISCONSIN

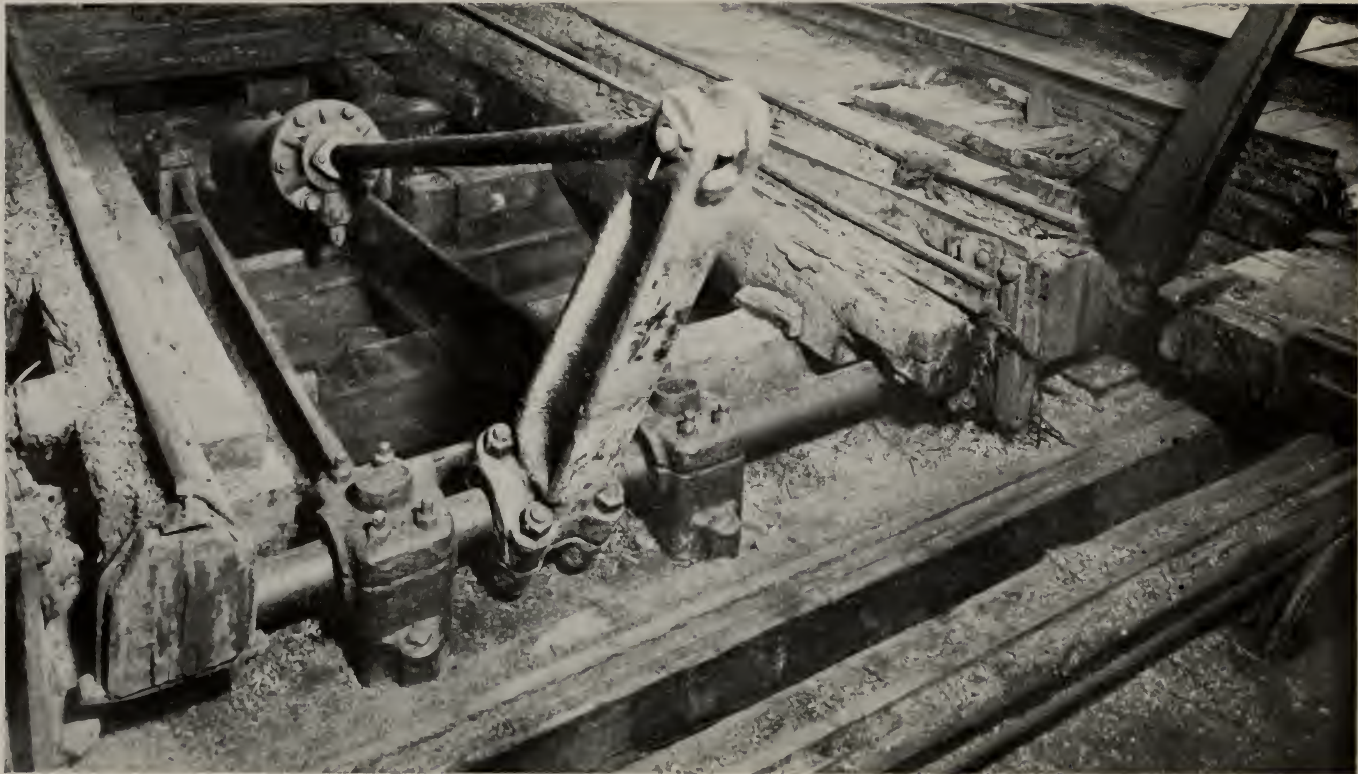
Photo Reproduction of Inside Page of Cover of The Timberman of August, 1921

PLAINTIFF'S EXHIBIT 17

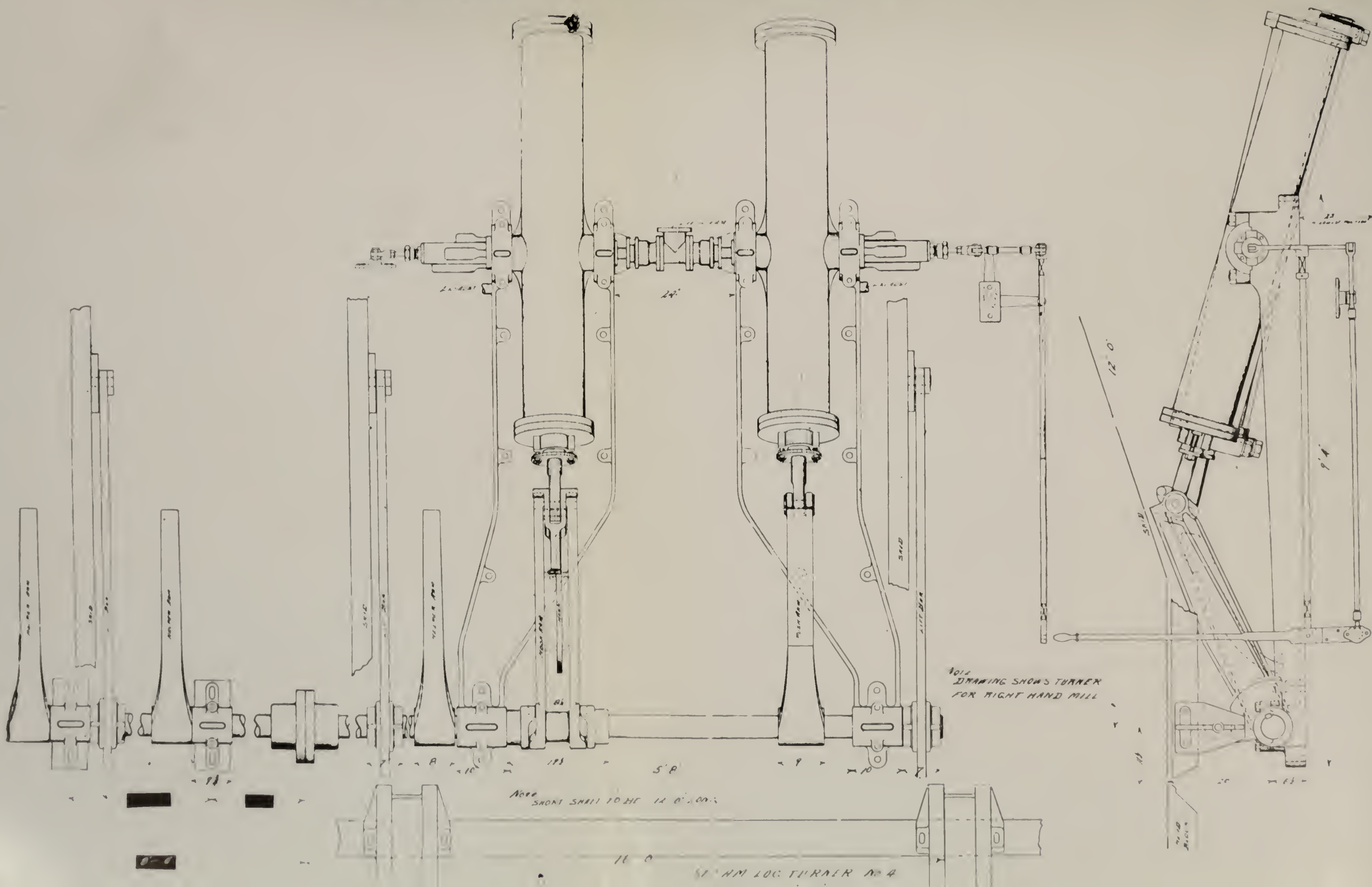


DEFENDANT'S INTERROGATORY EXHIBIT A

Being identical exhibit referred to in the Deposition of Chas. E. Cleveland as Defendant's Deposition Exhibit B



DEFENDANT'S INTERROGATORY EXHIBIT B



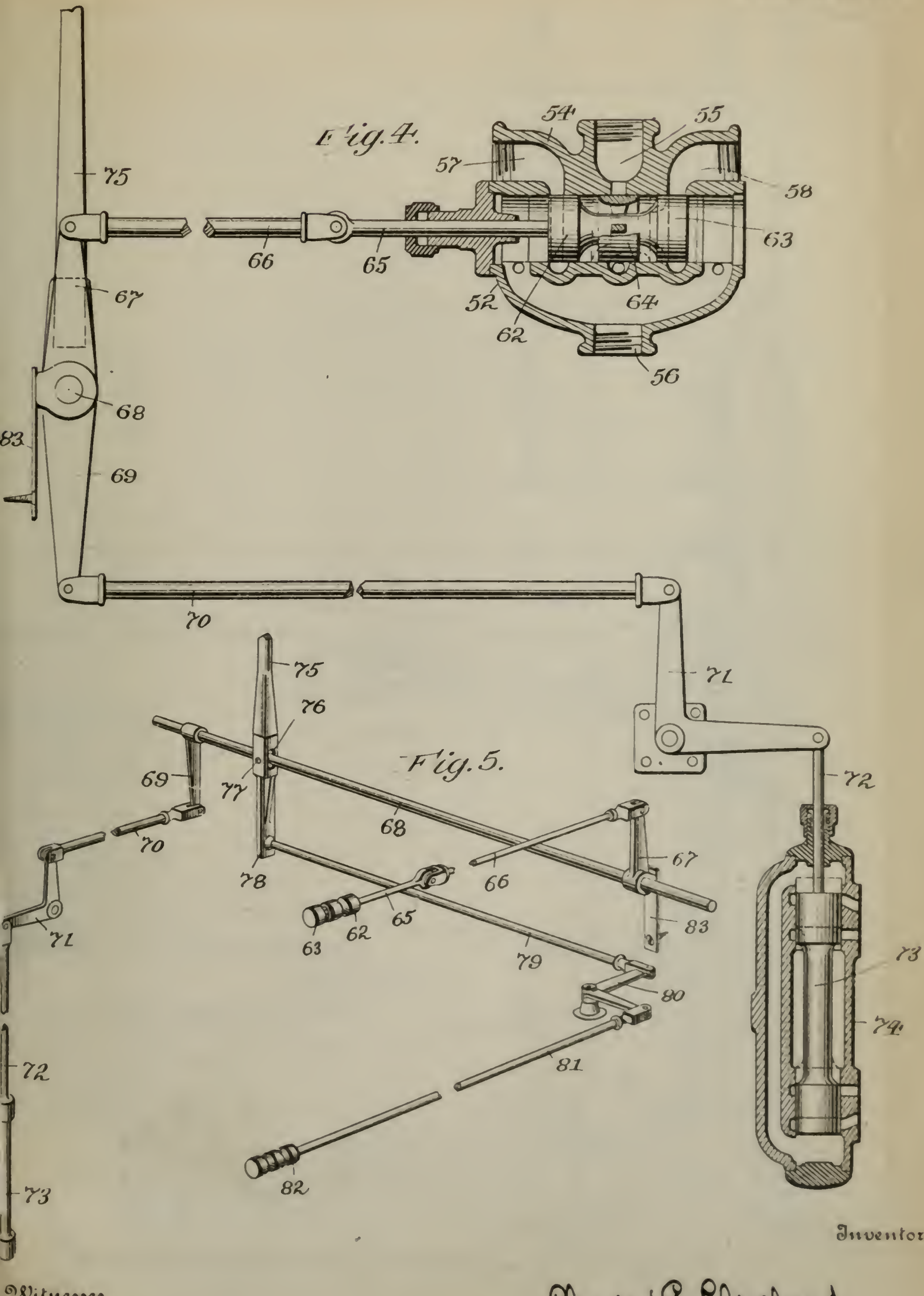
C. E. CLEVELAND.

LOG HANDLING MECHANISM.

APPLICATION FILED APR. 13, 1909.

933,231. Patented Sept. 7, 1909.

4 SHEETS—SHEET 4.



Inventor:

Witnesses

H. Kader

E. Montague

Charles E. Cleveland

By Dodge and Sons.

C. E. CLEVELAND.

LOG HANDLING MECHANISM.

APPLICATION FILED APR. 13, 1909.

933,231. Patented Sept. 7, 1909.

4 SHEETS—SHEET 3.

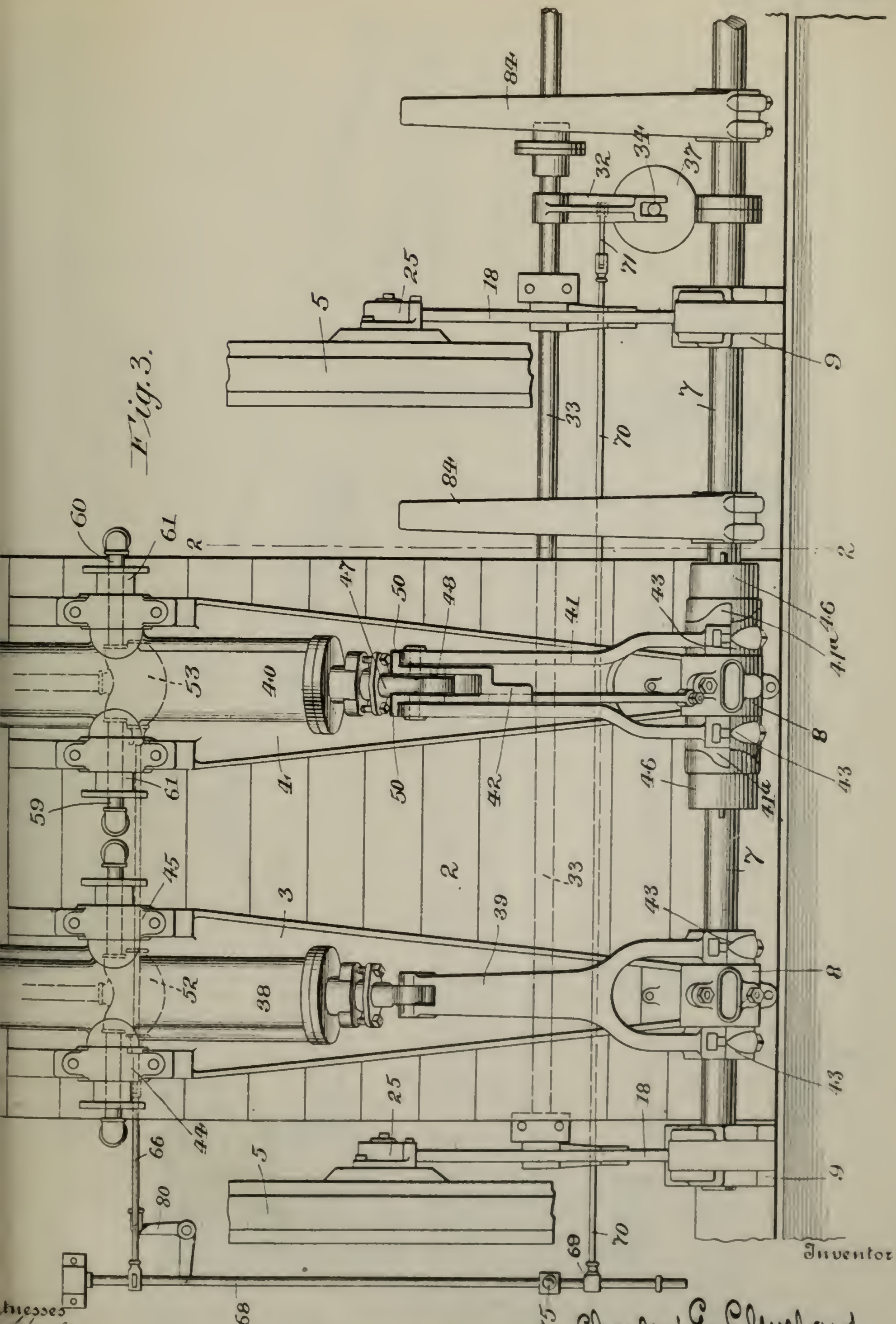


Fig. 3.

Inventor:

Witnesses

Charles E. Cleveland,

By Dodge and Sons

C. E. CLEVELAND.
LOG HANDLING MECHANISM.
APPLICATION FILED APR. 13, 1909.

933,231. Patented Sept. 7, 1909.

4 SHEETS—SHEET 2.

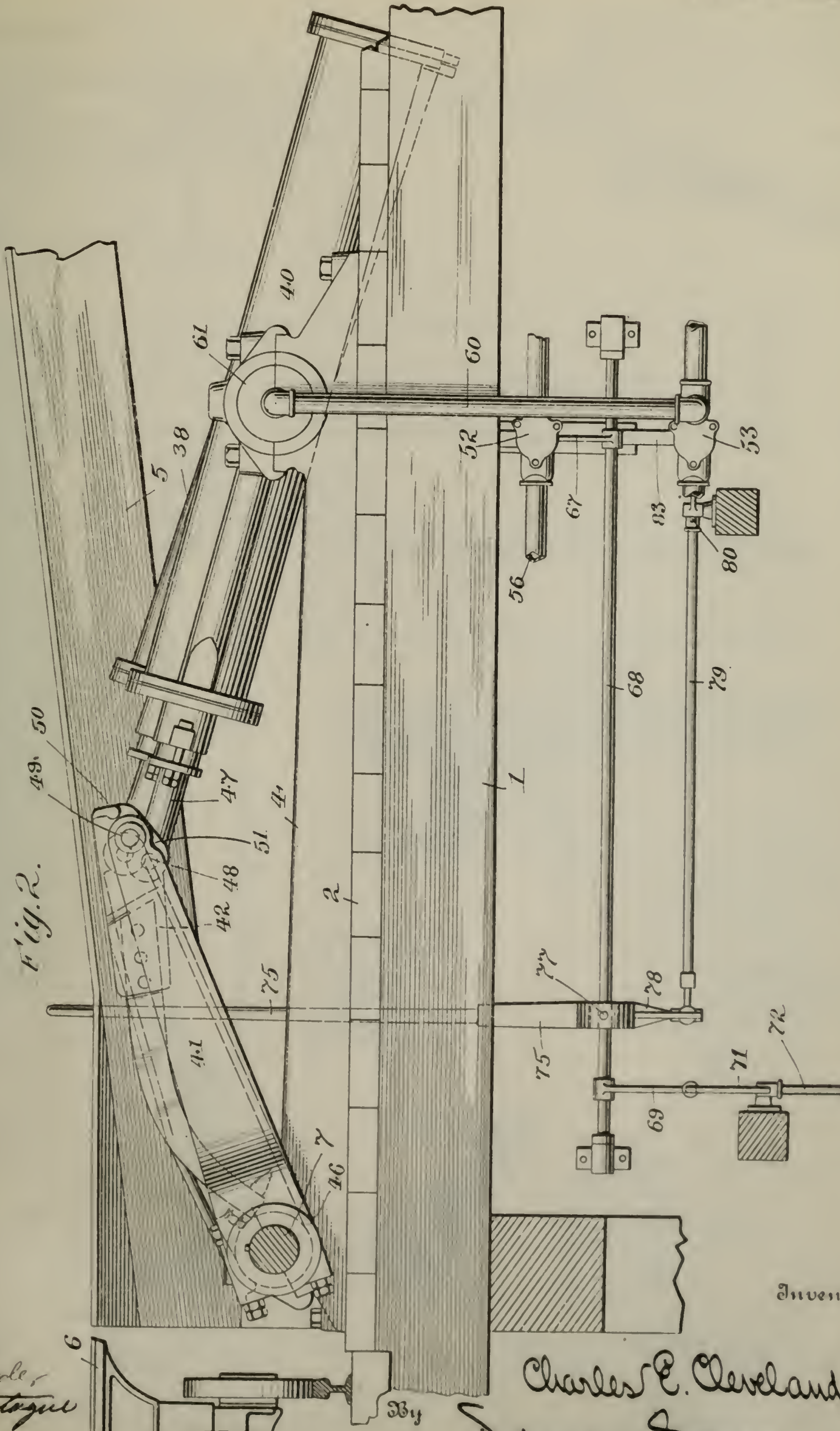


Fig. 2.

Witnesses
[illegible] Poole,
[illegible] Montague

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Charles E. Cleveland.
By Dodge and Sons

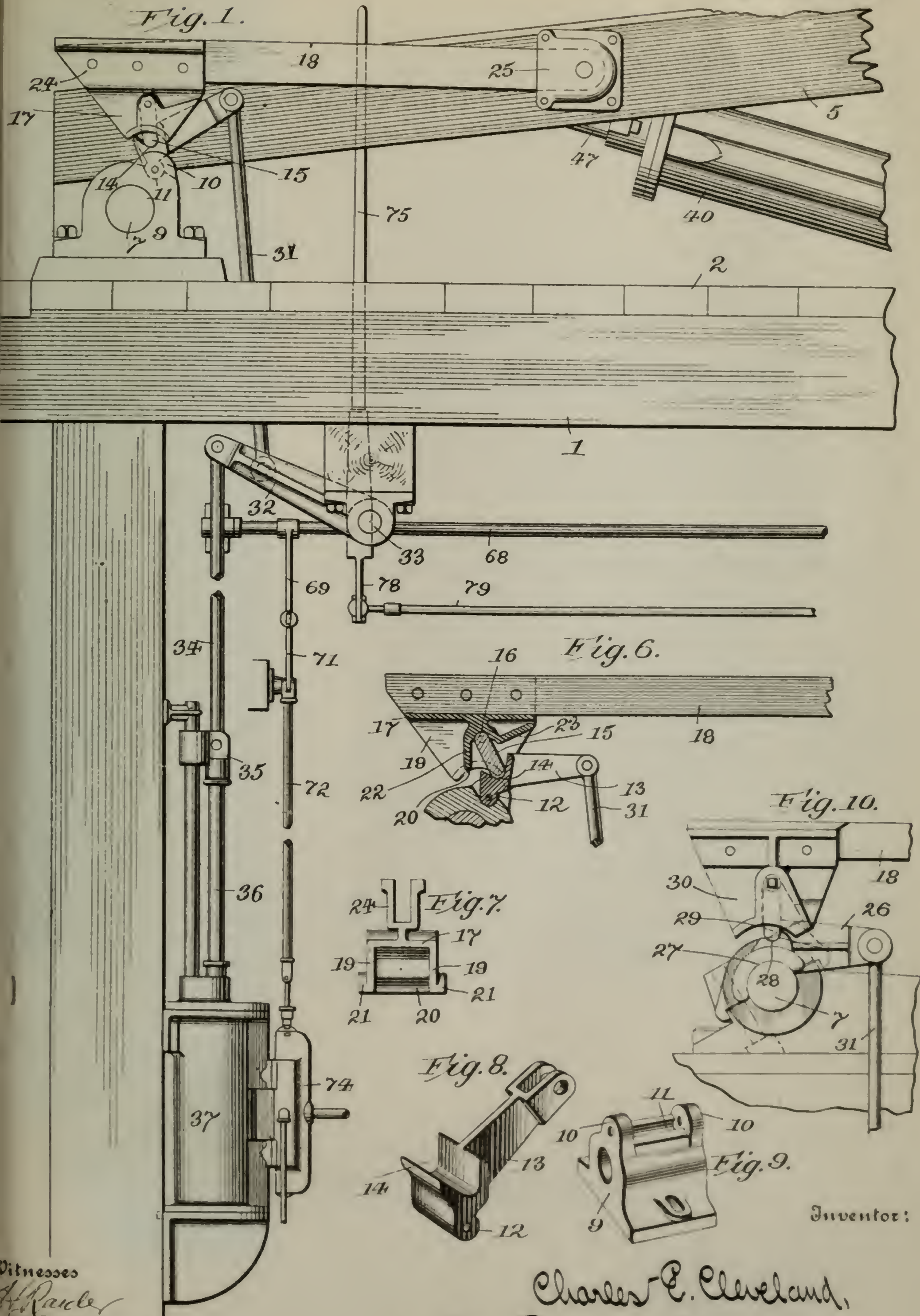
C. E. CLEVELAND.

LOG HANDLING MECHANISM.

APPLICATION FILED APR. 13, 1909.

933,231. Patented Sept. 7, 1909.

4 SHEETS—SHEET 1.



Witnesses

H. Raeder

E. Montague

Inventor:

Charles E. Cleveland,

By Dodge and Sons,

Attorneys.

Copy of Cleveland Patent in Suit

PLAINTIFF'S DEPOSITION, EXHIBIT A

UNITED STATES PATENT OFFICE.

CHARLES E. CLEVELAND, OF FOND DU LAC, WISCONSIN.

LOG-HANDLING MECHANISM.

933,231. Specification of Letters Patent. Patented Sept. 7, 1909.

Application filed April 13, 1909. Serial No. 489,675.

To all whom it may concern:

Be it known that I, CHARLES E. CLEVELAND, a citizen of the United States, residing at Fond du Lac, in the county of Fond du Lac and State of Wisconsin, have invented certain new and useful Improvements in Log-Handling Mechanism, of which the following is a specification.

My present invention pertains to an improved log-handling mechanism, designed more particularly to load the log onto a saw-mill carriage, to turn the same after a slab has been cut therefrom, to elevate and replace the log on the carriage.

The invention is illustrated in the annexed drawings; wherein:

Figure 1 is an end elevation of the apparatus, showing more specifically the independent skid-lifter or lifter-arm and the mechanism for operating the same; Fig. 2 a vertical sectional view on the line 2—2 of Fig. 3; Fig. 3 a top plan view of the mechanism as a whole; Fig. 4 a diagrammatic sectional view of the valve for operating the lifter, the valve for controlling the push arm (or arms) and the connections for operating the same; Fig. 5 a diagrammatic perspective view of the connections between the single operating lever and the three controlling valves, one each for the lifter, the push arm and the hook arm; Fig. 6 a vertical sectional view of the mechanism employed to raise and lower the lifter or movable skid member; Fig. 7 an end elevation of the supporting member for the outer end of the skid; Fig. 8 a perspective view of the lever or combined lever and rocker arm employed in connection with the skid; Fig. 9 a perspective view of the base or pillow-block upon which the lever is seated and rocks; and Fig. 10 an elevation of a modified structure which may be employed to raise and lower the movable skid.

The main object of the present invention is to produce a simple and efficient loading mechanism by which the log may be readily placed upon the saw-mill carriage, removed therefrom and turned, and again replaced.

A further object is to provide a suitable valve mechanism for controlling the pistons of the machine, which mechanism may be controlled by a single hand-operated lever, thus leaving the operator the free use of his feet, one of which may be employed to control a foot-lever or pedal which in turn controls the usual chain-feed, or the like, employed in connection with the skid-way.

A still further object is to provide a structure in which the valves and all joints which become subject to leakage due to wear are removed from the power cylinders and placed at a point or points where they are readily accessible.

Another object of the invention is to provide a superior form of bed-plate, upon which the power cylinders are mounted, and further, to so form the main push-arms that they may have a more extended and firmer bearing on their supporting shaft.

It is also an object of the invention to provide a simple and effective mechanism for raising and lowering the skid or lifter-arms.

With these and other objects in view, a detail description of the invention will be given, reference being had to the construction illustrated in Figs. 1 to 9 inclusive. In said figures, 1 denotes the main framework of the structure, upon which is placed the decking 2 which forms the support for the bed-plates 3 and 4, best shown in Fig. 3.

The fixed, inclined skid-way 5 may be of any improved form, and leads to a point adjacent to the carriage 6, partly shown in Fig. 2.

Any suitable feed mechanism for advancing the logs along the skid-way and any suitable lumber-stop device, such as those now commonly employed, may be used in connection with the skid-way, but inasmuch as these form no part of the present invention they are not illustrated.

A shaft 7 extends along the framework, parallel to the runway or tracks of the carriage, at the lower end of the skid-way, the shaft passing through bearings 8 formed at the outer ends of the bed-frames or plates 3 and 4 and through suitable pillow-blocks 9 arranged to one side of the skid-way 5, as indicated in Fig. 3. One of said blocks is shown in detail in Fig. 9, and is provided with an opening through which the shaft 7 extends. Each pillow-block is bolted securely to the timbers and is provided with two upstanding lugs or ears 10, between which is formed a rounded bearing 11 in which is seated a rounded member 12, formed upon the lower end of a combined lever and rocker-arm, shown in detail in Fig.

8. Said member is provided with an outwardly-extending arm 13, and in its upper face with a V-shaped recess or seat 14, adapted to receive the lower end of a link 15, the upper end of which fits in a rounded seat 16 formed in the under face of a supporting member or casting 17, in which the outer end of the movable or lifting skid-arm 18 is secured. Said casting is provided with downwardly-projecting side faces or walls 19, which at their lower ends are each provided with a curved or semicircular recess 20. Flanges or collars 21 extend outwardly from said lower walls and conform to the curvature of said recess, so that when the parts are lowered said flanges will come to rest upon the rounded faces of the lugs or ears 10 formed upon the pillow-block. Between the vertical walls 19 is formed a transversely-extending wall 22 and an inclined wall or web 23, the wall 22 tending to strengthen the structure and the web 23 likewise preventing the link 15 from being thrown too far forward upon the upward movement of the arm 13. The skid-arm, at its free end, is seated between upwardly-extending arms 24 (see Fig. 7), formed upon the casting, the skid-arm being bolted in place. The opposite end of the arm is fulcrumed or pivoted in a box or bearing 25 bolted to the side of the permanent skid-way 5. When the arm or lever 13 is thrown upwardly, into the position shown in Fig. 1, the toggle formed by the link and the rocker-arm will be straightened, and the movable skid-arm 18 is elevated at its lower end, so that it extends a distance above the upper face of the fixed skid-way 5. When the lever 13 is lowered, the free end of the skid arm will pass to a point just below the upper face of the fixed skidway 5. Under this construction it will be noted that the movable skid member 18 is not supported upon or actuated by the shaft 7, it being entirely independent thereof. If, however, it should be desired to support said member from the shaft, the construction shown in Fig. 10 may be employed, wherein a rocker-arm 26, having a rounded bearing 27 on its under face, is seated directly upon the shaft 7, the rocker-arm having formed in its upper face a seat or recess 28, adapted to receive the lower end of a link 29 which at its upper end is seated in a recess formed in a supporting frame or casting 30 for the movable skid member. In this, as in the former construction, there is substantially a toggle arrangement which, when the lever is thrown upwardly, tends to straighten the toggle to thereby elevate the movable skid member, and when lowered acts to break the toggle or to throw the link to one side, thereby permitting the skid member to be lowered. Two of said movable skid members are shown in Fig. 3, and it will be readily appreciated that as many skid members may be employed as may be found desirable in any particular plant. They are all actuated simultaneously through the connection about to be described.

Extending downwardly from each of the rocker-arms or levers is a link 31, each of said links in turn being connected to an arm or lever 32, see Fig. 1, arranged in line with the link, said arms being rigidly secured upon a counter-shaft 33 which extends beneath the framing, as best shown in Fig. 3. To one of the arms 32 (Fig. 1) is secured, at its outer end, a link 34, which in turn is pivotally attached to the upper end of a slide 35, carried at the upper end of a piston-rod 36, working in a cylinder 37. The valve which controls the admission and exhaust of steam to and from the cylinder 37 and the means for positioning the valve will be set forth in detail in connection with the valve mechanism employed in conjunction with the pusher-arm and hook-arm cylinders.

In most of the saw-mills heretofore constructed, in which power cylinders are employed for actuating the pusher-arm and hook-arm, the valve mechanism for controlling the admission and exhaust of steam to and from said cylinders has been placed in the trunnions of said cylinders, and as said parts are usually floored over or covered by the log-deck, they are more or less inaccessible. Further, being placed directly in the trunnions, the wear incident to the movement of the cylinders upon the trunnions caused the same to leak more or less quickly after the plant had been put into operation. With the present construction, however, the valve mechanism is all arranged at a point below the framing, where it is readily accessible.

The power cylinder 38, for actuating the push-arm 39, and power cylinder 40, for actuating the hook-arm 41, and its hook 42, are mounted in the same manner.

Each of the cylinder supporting bed plates 3 and 4 is alike in form, being a broad, straight casting provided at its outer end with a bearing 43 which embraces the shaft 7, and with bearings 44 and 45 for the trunnions of the cylinder. As will be seen upon reference to Fig. 3, the lower or outer end of each of the arms 39 and 41 is forked or bifurcated, the members or bearings 43 making a close fit against the boxes or bearings 8. Thus said arms get a relatively wide bearing upon the shaft and the parts all serve to mutually support and sustain each other, the straight and relatively broad bed-plate standing the strains to which it may be subjected much better than the usual crooked plates now in use. The arm 39 is made fast to shaft 7 and serves to rotate the same. Arm 41, however, is swiv-

eled on the shaft, being provided with jaws 41^a which function with clutch collars 46, keyed to shaft 7. Said collars assist in maintaining the arm in place, and likewise, when the arm is thrown upwardly, cause the shaft 7 to rotate and thus cause all of the arms (39 and certain helper arms hereinafter referred to) to move up against the log and prevent the same from skidding when the hook pulls the log over.

The piston-rod 47 of the power cylinder 40 is pivotally connected at 48 to the hook 42, Fig. 2, which latter in turn is fulcrumed at 49 upon the arm 41. As will be seen upon reference to Fig. 3, the hook arm is bifurcated, and is provided with outwardly-extending wings 50, which when the piston-rod is moved outwardly and the hook consequently thrown upward, pass about the end of the arm 41 until they enter the depressions 51 (Fig. 2) formed in the under side of the arm 41. Further outward movement of the piston-rod actuates the arm 41 directly, as the hook and arm are at such time locked together and move as one.

Each of the power cylinders 38 and 40 is provided with a controlling valve 52 and 53, respectively, Figs. 2 and 3, the valves being the same in form, one of which is shown in detail in Fig. 4. Said valve comprises a shell or casing 54 provided with a steam inlet 55, exhaust port 56 and steam ports 57 and 58, which are connected, respectively, to the pipes 59 and 60 (Figs. 2 and 3), which pipes pass through packing glands 61, secured in the outer ends of the trunnions of the power cylinders. Thus a steam-tight joint is effected between the cylinders and the pipes, which serve to convey steam to and exhaust the same from the power cylinders, the pipes, of course, being connected to the passages leading to the opposite ends of the cylinders, as is usual. A double-piston valve, having pistons 62 and 63 and an intermediate cut-off ring 64, is employed to control the passage of the steam to the inlet port 55 and one or the other of the ports 57 and 58, and to throw the exhaust port 56 into operative relation with the port through which live steam is not passed, said pistons being connected to a piston-rod or valve-stem 65, which in turn is pivotally connected by a link or rod 66 to a rocker arm 67 secured to a rocker-shaft 68. This shaft, as will be noted upon reference to Fig. 3, is located at one end of the apparatus and has secured to it a second rocker-arm 69, which in turn is connected by a link 70 and elbow-lever 71 to the valve-stem 72 of a double-piston valve 73, mounted in a valve-shell or casing 74, which valve controls the admission of the steam to and exhaust from the power cylinder 37 which actuates the movable skid arms 18.

As will be seen upon reference to Fig. 4, the arm 69 is slightly longer than the arm 67; consequently, the piston valve 73 will be moved faster than the piston of the valve 52. Furthermore, as will be seen upon reference to Fig. 4, the valve 73 is given but a slight lap, and consequently a slight movement thereof will admit steam to one end of the cylinder 37 and exhaust it from the other. On the other hand, the piston of the valve 52 is given considerable lap, and it requires a relatively greater movement to effect an opening of the ports in said valve, and as a consequence the lifter arm 18 may be actuated either to raise or lower the same, independent of any movement of the push-arm, the operation of which is controlled by the valve 52.

The rocking of the shaft 68 is effected through the agency of a handle or lever 75 through which the shaft passes, said handle being provided with an opening 76, see Fig. 5, the opening being sufficiently large to permit the lever to be rocked independently of the shaft in line with the axis of the shaft upon a pin 77 which secures the lever to the shaft. When, however, the lever is moved at right angles to the axis of the shaft 68, said shaft will be rocked and as a consequence the piston-valve 73 will be moved in one or the other direction, and if the lever is swung far enough, the piston of the valve 52 will likewise be actuated.

The lever 75 is provided with a downward extension 78, to which a link or rod 79 is universally connected. Said link or rod in turn is connected to one end of an elbow-lever 80, the opposite end of which is connected to a piston-rod 81, to which is secured a double piston 82, that controls the valve 53, which as before noted, controls the operation of the piston of the power cylinder which operates the hook arm. A flat plate spring 83 (Figs. 4 and 5) will be employed in conjunction with the flat face formed upon the rocker-arm 67 to throw the rocker-shaft 68 back to its medial position and thus hold the valves in their central or inoperative position. It will thus be seen that the handle 75 may be rocked in line with the axis of the shaft 68, thereby positioning the piston 82 of the valve 53 and causing the hook arm to be actuated independently of any movement of the skid arm 18 or the push arm 39. On the other hand, all three of the members may be actuated together if so desired, or brought into action successively. The lever having a universal movement, permits this operation and leaves the attendant free to control the log-stop and the feed mechanism through levers or a foot pedal.

Under the usual installation, the sawyer or operator stands with one hand on the lever controlling the steam feed and the other hand on the lever controlling the log-loader, with one foot on the independent

skid-lifter controlling pedal and the other foot on the log-stop pedal. This arrangement is obviously unsatisfactory. By connecting up the parts as herein specified, so that a single lever will control the operation of the log-turning arm, the skid-lifter and the hook-arm, the operator is relatively free and he may readily use one hand to actuate the pedal employed for controlling the log-stop. The other hand, of course, may be readily used to operate the lever which controls the steam feed. Thus the operator is left at least one foot upon which to stand.

From the foregoing description it is thought that the operation of the mechanism will be understood by those skilled in the art.

The apparatus permits the hook arm to be operated to catch the log to turn it down onto the deck and thereafter to raise the skid arms 18 independently of any movement of the push arm 39, so that the log is slightly raised above the head block before the push arm comes into play. This prevents the log from catching on the nose of the block as it would otherwise do were the arms 18 not lifted prior to the actuation of the push arm 39, and the coacting helper arms 84 which are secured to the shaft 7 and move therewith when the same is operated through the push arm 39.

Having thus described my invention, what I claim is:

1. In a log-handling mechanism, the combination of a skidway; a push-arm; a hook-arm; independent skid arms located to one side of the skidway; a power cylinder for each of said members; and a single operating lever connected to the valve mechanisms of said power cylinders for securing independent operation of said cylinders.

2. In a log-handling mechanism, the combination of a skidway; a push-arm; a power cylinder therefor; a hook-arm; a power cylinder therefor; independent skid-lifting arms arranged at one side of the skidway; a power cylinder for actuating said arms; a controlling lever; connections between said controlling lever and the valve mechanisms of the push-arm cylinder and the independent skid-lifter cylinder for bringing the skid-lifter cylinder into operation prior to the operation of the push-arm; and connections between said lever and the valve mechanism of the hook arm cylinder, said connections being such that said valve may be operated independently of the operation of the other power cylinders.

3. In a log-handling mechanism, the combination of a skidway; a push-arm; an actuating cylinder therefor; a hook-arm; an actuating cylinder therefor; an independent skid-lifter arm; a power cylinder for actuating the same; a rocker-shaft; connections between said shaft, the valve for the cylinder of the push-arm and the valve for the cylinder for the independent skid-lifter arm; a lever secured to said rocker-shaft to rotate therewith but capable of being swung in line with the axis of said rocker-shaft; and connections between said lever and the valve which controls the power cylinder of the hook-arm, whereby said hook-arm may be actuated by a movement of the lever independent of the actuation of the push-arm or the skid-lifter arm.

4. In a log-handling mechanism, the combination of a skidway; a push-arm; a power cylinder therefor; an independently movable skid-arm; a power cylinder therefor; a hook arm; a power cylinder therefor; a rocker-shaft; connections between said rocker shaft and the valve for controlling the power cylinder of the push-arm and the valve controlling the operation of the cylinder for the independent skid-arm, said connections being such that the last-named cylinder will come into operation prior to the operation of the push-arm cylinder; a lever secured to the rocker-shaft, the connection being such that the lever may be moved in line with the axis of the shaft without moving the same; and connections between said lever and the valve for controlling the hook-arm power cylinder, whereby the hook-arm cylinder may be actuated independently of the other parts.

5. In a log-handling mechanism, the combination of a skidway; a push-arm; a power cylinder therefor; an independent skid-lifter; a power cylinder therefor; a hook-arm; a power cylinder therefor; a valve for controlling the admission of steam to and exhaust from the power cylinder of the push-arm; a valve for controlling the admission of steam to and exhaust from the power cylinder of the independent skid-lifter, the last-named valve being given a lap less than that of the first-named valve; a lever for moving said valves simultaneously; and connections between said lever and the valve for controlling the admission of steam to and exhaust from the power cylinder of the hook arm.

6. In a log-handling mechanism, the combination of a skidway; an independent skid-lifting arm pivotally connected at one end thereto; and a toggle mechanism for raising and lowering the outer end of said skid-lifting arm.

7. In a log-handling mechanism, the combination of a skidway; an independent skid-arm pivotally connected thereto; a link arranged below the free end of said arm; and means for throwing the link into and out of vertical position, whereby the arm may be raised and lowered.

8. In a log-handling mechanism, the combination of a skidway; an independent skid-lifter pivotally connected at one end thereof; a link arranged beneath the free end of

said skid-lifter; a fixed bearing; and means interposed between said fixed bearing and the lower end of the link for throwing the link into and out of vertical position, whereby the skid-lifter may be raised and lowered.

9. In a log-handling mechanism, the combination of a skidway; an independent skid-lifter pivotally connected thereto; a link mounted below the free end of said lifter; a fixed bearing; and a combined rocker and lever-arm arranged between said bearing and the lower end of the link, whereby when said member is actuated the link will be thrown into and out of vertical position and the skid-lifter thereby raised and lowered.

10. In a log-handling mechanism, the combination of a skid-way; an independent skid-arm pivoted thereto; a link arranged beneath the free end of said skid-arm; a pillow-block having a seat or recess formed in the upper face thereof; and a combined lever and rocker-arm, the lower end of which rests in the seat and is provided in its upper face with a socket or recess for the reception of the lower end of the link.

11. In a log-handling mechanism, the combination of a skid-way; an independent skid-arm pivotally secured thereto; a casting secured adjacent to the outer end of said arm, the casting having flanges on its lower end; a link, bearing at its upper end in a seat or socket formed in the casting; a pillow-block provided with upstanding lugs, said block having a seat or recess formed therein intermediate said lugs; and a combined lever and rocker-arm, the lower end of which is seated in the recess in the pillow-block, said arm being likewise provided with a recess in its upper face to receive the lower end of the link.

12. In a log-handling mechanism, the combination of a bed-plate provided at its outer end with a shaft-bearing; a shaft extending through said bearing; an arm in operative relation with the shaft, said arm being bifurcated and straddling the bearing formed upon the outer end of the bed-plate; a power cylinder pivotally mounted upon the bed-plate; and a piston-rod working in the cylinder and connected at its outer end to the adjacent end of the arm.

13. In a log-handling mechanism, the combination of a bed-plate provided at its outer end with a shaft-bearing; a shaft extending through said bearing; an arm the lower end of which is bifurcated and straddles the bearing formed upon the bed-plate and is in operative relation with the shaft; a bearing formed upon each side of the bed-plate adjacent to its rear end; a cylinder having trunnions resting in said bearings; a piston-rod connected to the adjacent end of the arm; pipes for conveying fluid under pressure to and permitting pressure to pass from said cylinder, the pipes passing through the trunnions; and valves located beneath the bed-plate for controlling the admission of fluid to and the exhaust thereof from said cylinder.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES E. CLEVELAND.

Witnesses:
FRANK J. WOLFF,
EARL J. LOHMILLER.

No. 4231

IN THE

United States Circuit Court of Appeals

FOR THE

2

NINTH CIRCUIT

D. J. MURRAY MANUFACTURING COMPANY, a corporation,
Appellant,

vs.

SUMNER IRON WORKS, a corporation and SILVERTON LUMBER COMPANY, a corporation,
Appellee.

SUPPLEMENT OF EXHIBITS TO TRANSCRIPT OF RECORD

Upon Appeal from the United States District Court for the District of Oregon

IRWIN-HODSON, PORTLAND, ORE

INDEX TO EXHIBITS

Photographic reproduction of infringing log turner, particularly showing the push-arm unit, installed by Sumner Iron Works at Vancouver, Washington, 1923, after this infringement suit had been instituted.

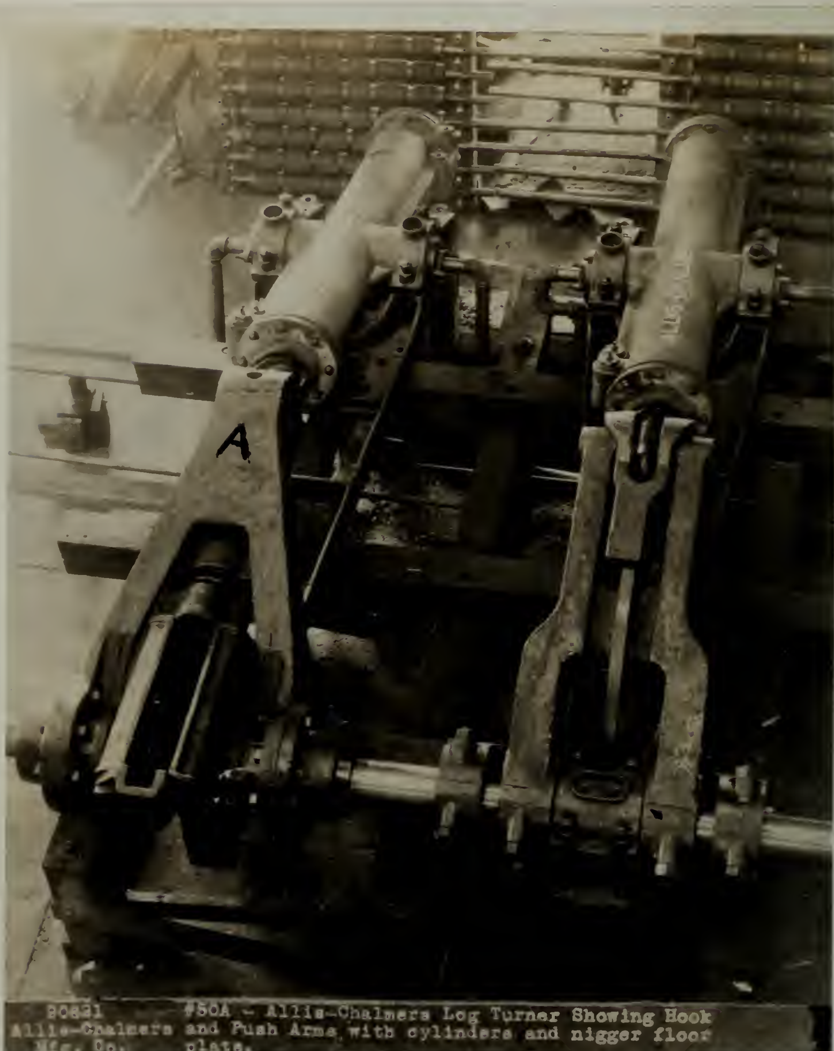
PLAINTIFF'S EXHIBIT 14 *(Trans. 57, 60)*

Photographic reproduction of infringing log turner, particularly showing the hook arm unit, installed by Sumner Iron Works at Vancouver, Washington, 1923, after this infringement suit had been instituted.

PLAINTIFF'S EXHIBIT 15 *(Trans. 57, 60)*

Photographic reproduction of Cleveland log turner as manufactured by Allis Chalmers, licensee, and installed in Jones Lumber Mill at Portland, Ore.

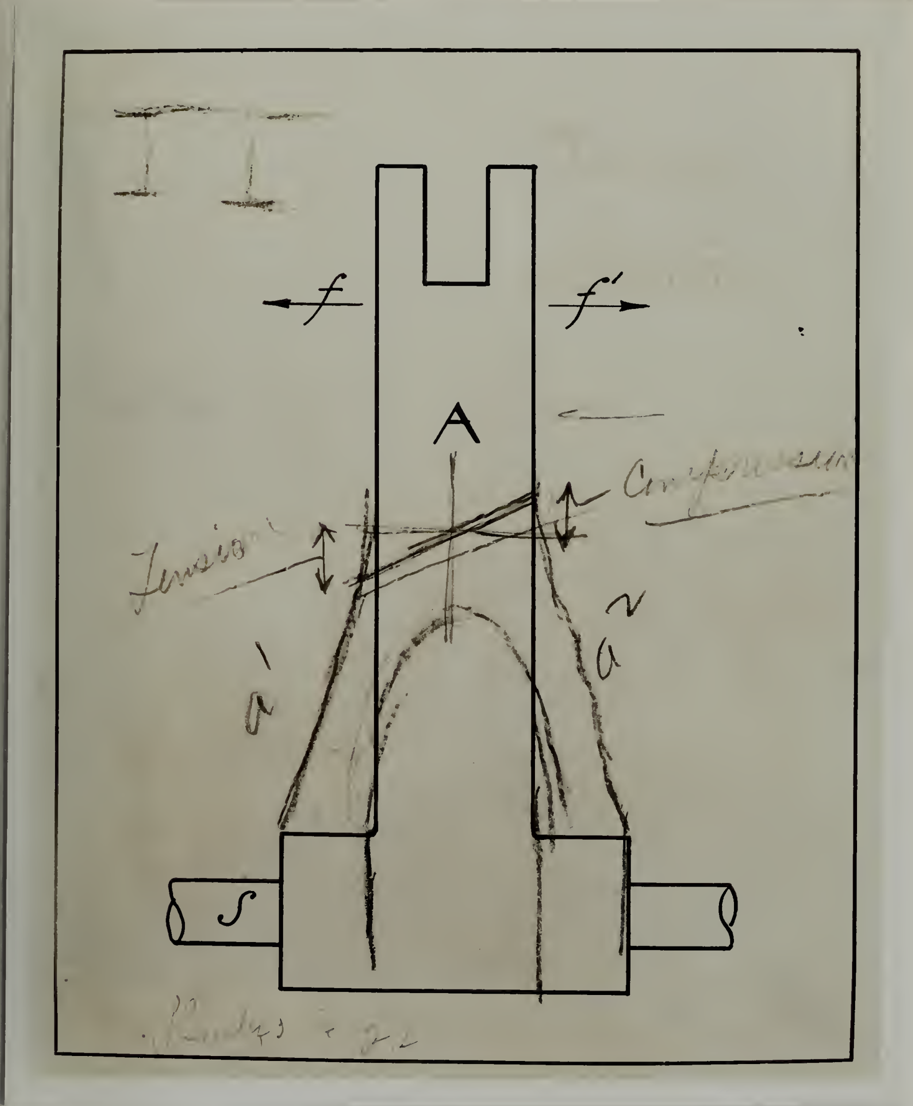
PLAINTIFF'S EXHIBIT 19 *(Trans. 81, 87)*



PHOTOGRAPHIC REPRODUCTION OF PLAINTIFF'S EXHIBIT 22

(Trans. 103, 115, 135)

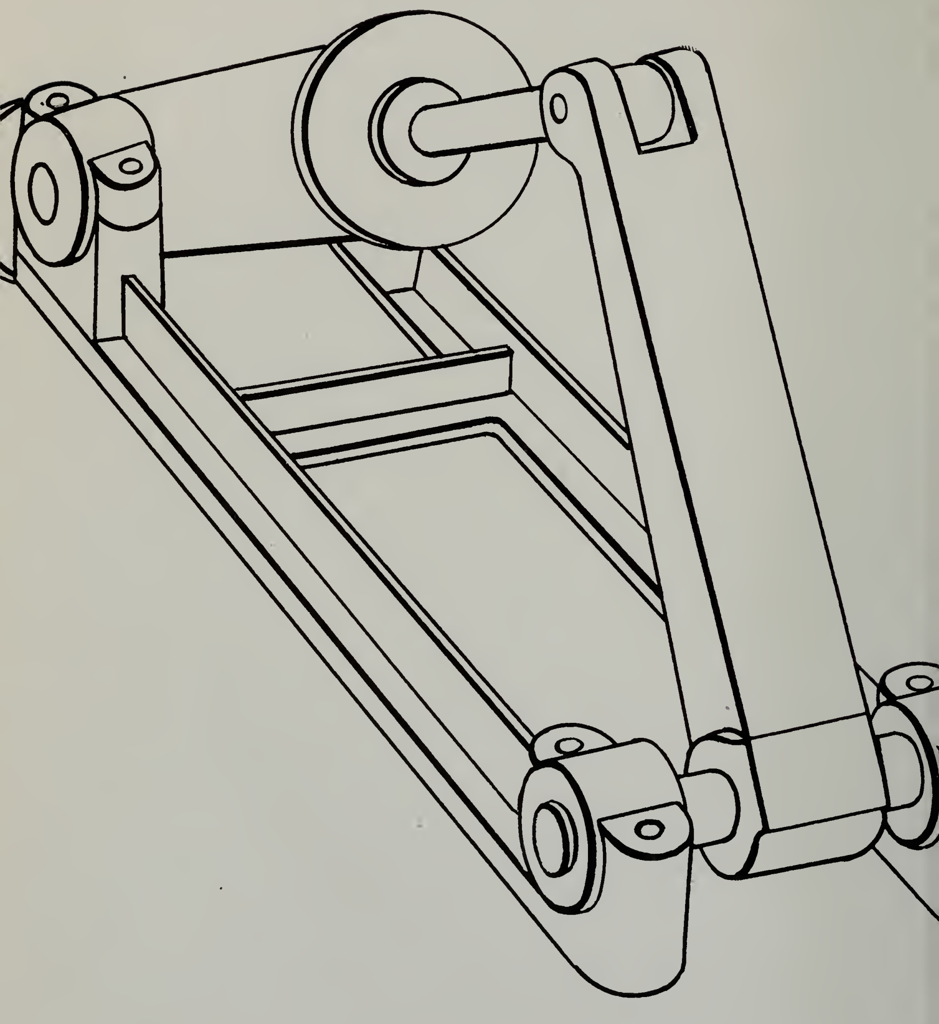
Note: The rough lines were drawn in red pencil on original sketch.



Outline cut of model of push-arm unit of straight-bed type of log turner seen by Sumner at Frazer River in 1906.

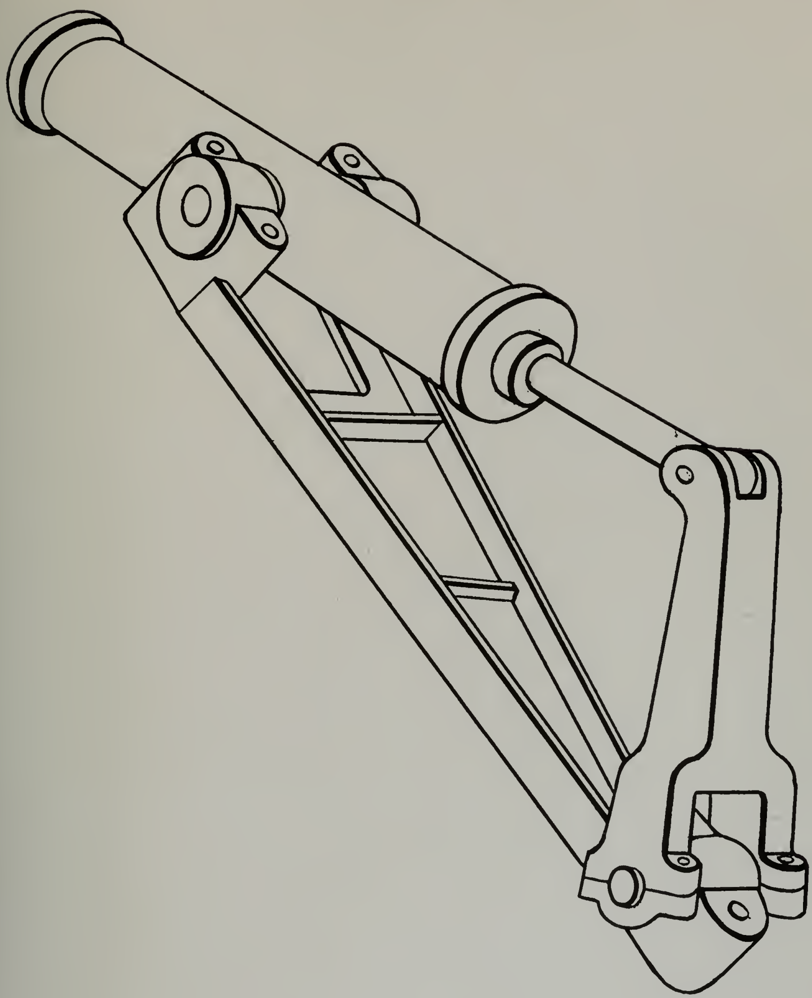
DEFENDANTS' INTER. EX. A AND EX. 27

(Trans. 67)



Outline cut of model of defendants' model of push-arm unit of Cleveland patent.

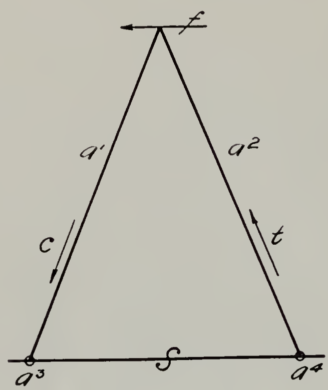
DEFENDANTS' EX. 26 *(Trans. 66)*



Diagrammatic sketch of A-frame principle.

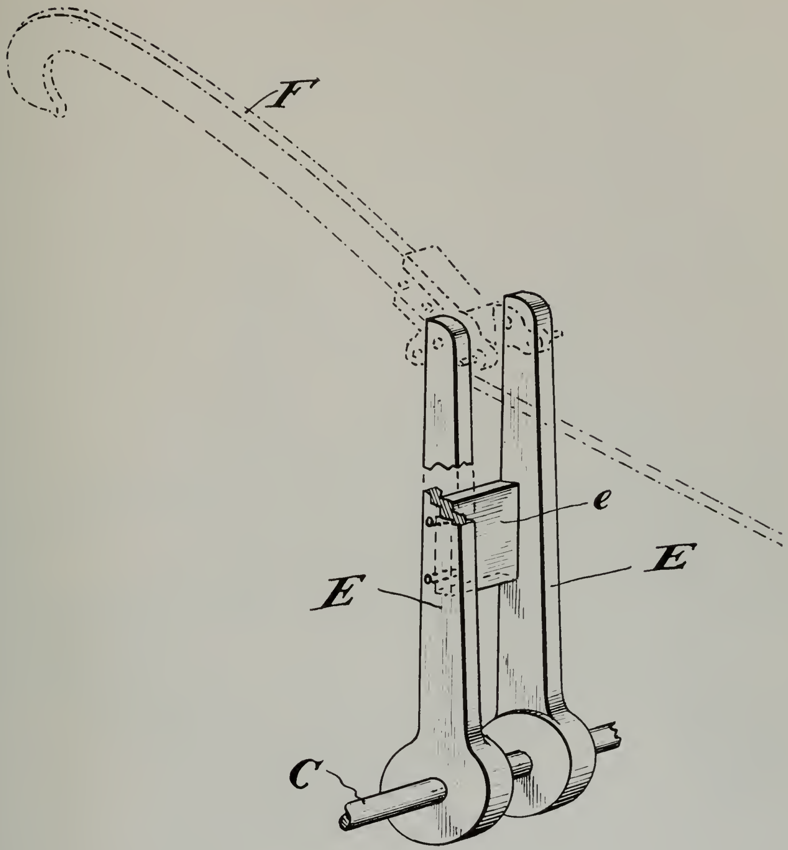
as applied to the construction exhibited by the Cleveland patent. (Hines. Trans. 96, 100, 102.)

PLAINTIFF'S EX. 21



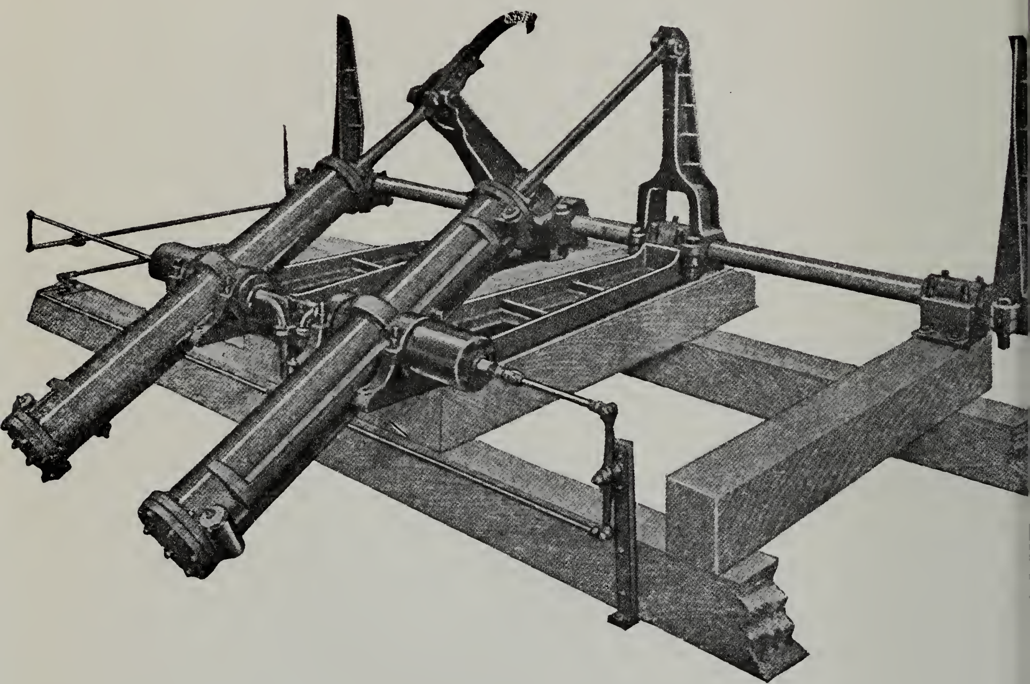
Cut of Arm E in patent of Flavel Simonson No. 448,592, March 17, 1891.

DEFENDANTS' EX. 29



Reproduction of the cut shown on the fourth page of *Sumner Iron Works Bulletin No. 4,* constituting Defendants' Exhibit 31. (Trans. 153.) On the front page of this bulletin is a cut identical with that shown in the cut of the advertisement of Sumner Iron Works appearing on the inside page of The Timberman of August, 1921, constituting Plaintiff's Exhibit 17. Trans

DEFENDANTS' EX. 31 *(Trans. 153)*



"Sumner Standard Straight-Bed Log Turner".

Under the cut here shown appears the following:

* * * * *

"BEDS. As the foundation of this machine, which we consider one of the most essential features, we have adopted the straight line style of bed *which we consider the best in principle, in practice and from an engineers' standpoint.* This construction eliminates any tendency to produce twisting strains on shaft or bearings which occur on the offset type of beds. *The fact that both beds are identically the same and are either handed makes it easier to stock or obtain repairs in case of breakage, as either bed can be used under either cylinder.*

* * * * *

"ARMS. *The push and hook arms are made of electric cast steel and designed to straddle the main shaft bearings on beds.* The pins and pin bearings on the outer ends of the hook and push arms are exceptionally large and long which greatly prolongs the life of these parts. The cast steel hook bar socket is designed with an exceptionally deep throat which eliminates the possibility of bending the piston rod, which often occurs in faultily designed turners, causing expensive repairs and delays."